

Scanning - Shortwave - Ham Radio
Equipment - Computers



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VOICES FROM THE BANANA BELT

**Listen to the Flight Testers
Basic Short Wave Antennas**

**MT Reviews:
Radio Shack Pro-97 Handheld
Kaito KA105 Pocket Portable**



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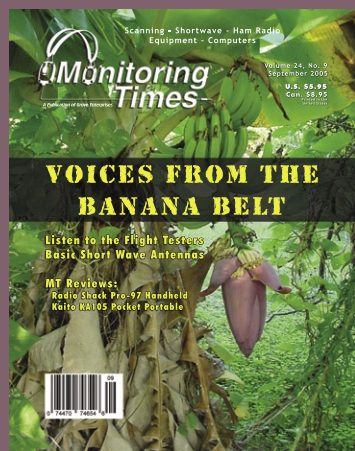
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Cover Story

Voices from the Banana Belt

By Gayle Van Horn

Central America has settled down somewhat since the days when you could witness a revolution by radio from your armchair. In fact, many of the radio stations that battled each other for the hearts of the people are now gone. In their place, evangelists now compete for the hearts and souls of today's mixture of indigenous and European descendants.

This article takes a comprehensive look at the past and present of radio broadcasting in each of the six countries that make up Central America, including mediumwave stations and the numerous on-again, off-again broadcasters that make radio such an adventure. While shortwave broadcasters are becoming fewer, even low power medium-wave stations can occasionally be heard in the U.S.

When you do log a voice from the banana belt, use the handy address list provided in the article to try for a QSL. Story starts on page 8.

Cover photo by J. Alex Halderman

C O N T E N T S

Listening to the Flight Testers 12

By Ron Perron

On the Chesapeake Bay south of Baltimore lies the Naval Air Station at Patuxent River, home to the Navy's Flight Test Center. Today, it's hard to imagine this area was chosen for its isolation to test new, often classified projects. It makes for some exciting scanning, with around 50 tenant activities making use of the complex. We give you a rundown of the flying units at "Pax" and the frequencies that have been monitored by the author and others.

Shortwave Log 17

By John F. Catalano

Marrying radio monitoring to the internet is a field that has made great strides, but SWLog is so slick and so comprehensive, it's hard to know where to start to describe it. First of all, it's FREE!

SWLog will allow you to consult nine different shortwave frequency databases, as well as your own logs and logs of others in the SWLog "community." The program will also control almost any serially enabled receiver from your computer.

The really innovative part is being able to see what other users are hearing in real-time and tuning your receiver to the same signal with a click of the mouse. Of course, the more folks who join in on the fun, the more fun it will be! Kudos to the SWLog team!

Reviews:

The Radio Shack Pro-97 is a lot of radio at a decent price, says our reviewer. He especially enjoyed the 1000 memory channels, trunking capability, and Signal Stalker II technology which allows you to listen to nearby transmissions without knowing the frequency (see page 70).

For around \$40, the Kaito KA105 is the poor man's pocket digital shortwave radio. For the price, this is a great little travel radio with sleep timer and alarm. Take your hobby with you without worrying about loss or damage to your primary receiver (page 66).

Lucky owners of the Ten-Tec RX-320 or RX-350 radios have a new receiver control and signal analysis program available to them. ScopeStation by Callsign is designed for "advanced ham radio operators and shortwave listeners," and it gives you more ways to tune your radio than I can count on one hand. Check it out on page 72.

Ham operators who haven't yet tried operating using PSK31 might want to try building the Warbler – either from the kit from Small Wonder Labs or building their own from scratch. (See On the Bench, p 69.)



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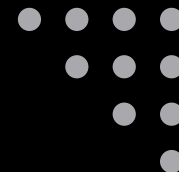
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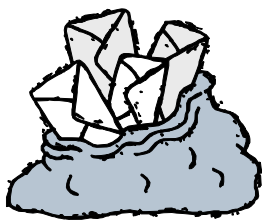
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TO THE EDITOR

Don't Forget Ten-Tec

"You state in the May issue that the only dedicated desktop shortwave left is the JRC-545, which costs around \$1800.00.

"What about Ten Tec? I believe they are alive and well with the RX-320D at fewer than \$340.00, and the RX-350D at \$1200.00, which I own and am truly happy with. Just like the JRC they are DSP receivers. ALL of the above radios can still be purchased at U.S. dealers today. So Icom and Drake have given up the market for now; there are still choices out there. Good ones at that!

"With Sony considering leaving the market and Eton E1XM coming (soon, someday maybe) Ten Tec is an American Company, the only one making and selling to both hams and SWLs. Don't forget them and don't count them out."

— Harry Taylor

Thanks for the reminder of the Ten-Tec RX-350D. We had heard the 350 was discontinued but didn't realize the unit was back in production as the 350D. Of Ten-Tec's other models, however, none of them are stand-alone desktop models: the RX-320 is a computer-hosted receiver, and the RX-340 is a professional rack-mounted model. Of course, there are also SW receivers being sold in the UK and elsewhere, but they are not FCC type-accepted for sale within the U.S. And, there are still many portables available from Eton, Sangean, Kaito, etc.

Anyway, thanks for catching us on that error, and I'm really glad you like the Ten-Tec 350, (which *MT* reviewed July 2002). Maybe some other readers will want to give this DRM-capable high-end receiver a second look.

— Rachel Baughn, Editor

Reader Raves

"I've just today gotten my first issue by Internet of *MT*. Download went without a hitch and I'm so glad to again be 'in the loop.' It was something the print version can't provide for those of us who are RVing most of the time. Snail Mail just didn't cut it. E-mail and direct satellite Internet connectivity sure does! Thanks again for your forward look at subscription services and information dissemination."

— Vern Modeland, W0JOG

"Thanks for the awesome article and info on the Palmetto System. I am a resident of Myrtle Beach, SC, and have listened to the MPX (now Palmetto System) for a long time. It has come a long way in a short time along the Coastal Regions. Your article and information was right on and very accurate. Thanks for the great resource not only for me but for all the listeners in this area."

— Calvin Springs, Myrtle Beach S.C.

Type II and EDACS Update

By David L. Wilson

This is a continuation of the discussion in the June 2005 *On the Bench* article on Motorola Type II and Ericsson EDACS talkgroups, with some additional examples and clarification. (*You'll need to read the original article to get the full benefit - ed.*)

With regard to EDACS Agency/Fleet/Subfleet assignments, it is very puzzling why all scanner manufacturers (and thus hobby trunking lists) have partitioned the bits with 4 for agency, 4 for fleet and 3 for subfleet, when the vast majority of EDACS systems use 3 for agency, 4 for fleet, and 4 for subfleet.

On many EDACS systems, you will note the police, fire or some other principal agency is often 02-021. Though it appears to be Agency 2 (or 02), Fleet 2 (or 02), and Subfleet 1 when viewed as AFS 4/4/3 as all current scanner manufacturers do, we now realize that when the bits are reconfigured as AFS 3/4/4 (per the June article), it is really 1-0101. That is, Agency 1, Fleet 1 (or 01), Subfleet 1 (or 01), which makes more sense.

In that same system, the first subfleet of the next fleet will be 1-0201 (Agency 1, Fleet 2, and Subfleet 1) in the proper AFS 3/4/4 breakdown of AFS bits. However, our scanners, using a breakdown of AFS 4/4/3, designate it as 02-041, making us incorrectly think it is Agency 3 and Fleet 4.

This is the reason why many people have been puzzled by seeing an abundance of even-numbered fleets – it appears that way when one divides bits as AFS 4/4/3 instead of as 3/4/4. It might be interesting if someone could explain how this apparently standardized confusion originated among all trunking scanner manufacturers.

As an example of why it's worth using the correct assignments, consider some of talkgroups in the Aurora, Colorado, EDACS system on pg. 26 of the July 2005 issue of *Monitoring Times*. In the table below, we show it as AFS 4/4/3 as in the article (and as is necessary to program the scanner) and then as AFS 3/4/4 – which is really how the system is designed.

4/4/3	3/4/4	Designation
04-021	2-0101	Fire (Dispatch)
04-041	2-0201	EMS
04-121	2-0601	Fire (Training 1)
06-041	3-0201	Snow Removal 1
14-021	7-0101	Police (Dispatch 1)
14-041	7-0201	Police (Dispatch 2)
14-061	7-0301	Police (Dispatch 3)
14-081	7-0401	SWAT

The reader immediately will notice that the 3/4/4 correct breakout of AFS talkgroups makes much more sense than the 4/4/3 incorrect breakout of AFS talkgroups as used by our scanners.

Motorola Type II

With regard to the Motorola Type II portion of the article, it should be noted that it assumes the 5th lowest bit in the 11 talkgroup bits is a "1" (though some have reported seeing talkgroups in which this is not so). Systems where the 5th lowest bit is a "1" can be recognized as ones in which the 3rd hex digit is always odd (1, 3, 5, 7, 9, B, D, or F).

In general, though the June article is of great use in understanding EDACS systems, it is of limited use in understanding Motorola Type II systems, which seem more arbitrary in their setup. Following are some examples that demonstrate the fact that the first Type II talkgroup in an agency set is often some "nice" number chosen by the system designer as stated in the June article:

Hex	Dec	Sys	Service
001	16	0	Canton PD Dispatch 1
3E9	16016	500	Stark Co. Dispatch
3E9	16016	500	Fairfax Co. PD ch. 1
7D1	32016	1000	Summit Co. SO Dispatch 1

Let your computer do the calculating!

If you feel intimidated by all the conversions, Dave Wilson has written simple software programs for both Motorola Type II and EDACS systems to simplify and speed up the decimal/hex conversions mentioned in the June article. The programs are available for download in the scanning and technical sections of the online *MT* Reference Library (http://www.monitoringtimes.com/html/mt_reference_library.html). Thanks, Dave, for going the extra mile to help make sense out of an aspect of trunking that few folks would tackle!

This page is open to your considered comments. Opinions expressed here are not necessarily those of *Monitoring Times*. Letters to the Editor may be rephrased or shortened for length and clarity. Please mail to Letters to the Editor, 7540 Highway 64 West, Brasstown, NC 28902, or email editor@monitoringtimes.com.

Happy monitoring!

— Rachel Baughn, KE4OPD, editor

AMATEUR RADIO

FCC Set to Remove Code Requirement

In a July 15 Proposed Rule Making and Order, the Federal Communications Commission is planning to remove the Morse Code requirement for all classes of Amateur Radio license. This will put CW on an equal basis with the many other communication modes which hams may use but in which they are not required to demonstrate proficiency. The FCC declined to make other modifications to the structure or the privileges of the amateur service.

A comment and reply period follow, in which the public may state its views, but all indications are that Morse Code will no longer be a requirement for any amateur license in the U.S. by the end of 2005.

Radio-Friendly BPL?

Maybe when a communications company dabbles in the field of broadband over power lines (BPL) you get a more radio-friendly result. Motorola has thrown its hat into the BPL ring, but unlike most other players, they developed their system with an eye to preventing radio interference, in consultation with the Amateur Radio Relay League. The ARRL is cautiously optimistic about Motorola's system, which introduces the broadband system on the low power side of the power transformer and avoids the higher voltage wires that cause radio interference.

Dave Sumner spoke for the ARRL, "We look forward to seeing the first Powerline LV system in operation, and to continuing to work with Motorola to ensure that their new product is indeed the first BPL system that is a solution, not a problem."

Motorola's initial customer is Broad River Electric, a 25,000-customer rural utility in up-state South Carolina.

SIGNALS IN SPACE

Cellphones on Planes?

In the debate over whether to allow mobile phone usage on board airplanes, we're beginning to wonder who's pushing for a rule change? From what we read, the passengers don't want it, the FBI and Homeland Security don't want it, astronomers really don't want it, flight attendants don't want it—who's left? Even cellphone companies have concerns about the large footprint of an airborne call.

Radio astronomers are particularly anxious, as the second harmonic of most cellphone emissions lands in the spectrum reserved for radioastronomy and the search for extraterrestrial intelligence (SETI), and the overhead transmissions would likely be within line of sight. Using an onboard "pico-cell" would help minimize this problem.

So why hasn't the FCC dropped the whole idea by now? On the other hand, being able to access the internet or read your email while in flight—now that's a great idea!

New Telescope in the Works

The Atacama Large Millimeter Array (ALMA) project is an international collaborative effort to build and operate the world's most sensitive millimeter and sub-millimeter wavelength telescope. General Dynamics was recently awarded a \$169 million contract to design, manufacture and deliver twenty-five 12-meter antennas for the North American portion of the international astronomy facility.

ALMA's primary goal is to provide a radio telescope array that will allow scientists to observe and image galaxies out to the edge of the universe, and stars and planets in their formative stages with spatial resolution 10 times higher than the Hubble Space Telescope. ALMA ultimately could consist of an array of up to 64 antennas, all in Chile's Atacama Desert, 16,500 feet above sea level.

New Signals in Near Space

But wait a minute—puny cellphone signals from aircraft may be the least of radio-telescopes' problems. The sky above us may soon get even "noisier."

US communications outfit Sanswire Networks plans to deliver line-of-sight wireless broadband and mobile phone signals to an area the size of Texas from a single transmission point in the stratosphere. Hovering over a fixed point above the weather and aircraft lanes, a Stratellite blimp 450 to 800 feet in length can carry several thousand pounds of microwave transceivers. The communications and GPS navigation system are powered by an array of thin flexible solar cells that cover the top of the ship.

The only thing lacking is NASA and FAA approval and Air Force permission for the prototype Stratellite One to lift off from Palmdale, California, for testing over Edwards Air Force Base.

Sanswire is only one company experimenting with stratospheric applications—For example, AeroVironment claimed successful test of their unmanned aerial vehicle powered by liquid hydrogen which can fly 12 miles high for a week, though its applications are primarily military.

Going higher is the mesosphere or "near space"—too high for aircraft but too low for satellites. The military is testing unmanned helium balloons at this altitude. The balloon could carry communications equipment, cameras, or even weapons. The mesosphere is still considered sovereign airspace, so their use for spying would be a sensitive issue.

The incentive for this interest in blimps, balloons and UAVs is to free up satellite space with less expensive technology. The military is also looking at ways to capitalize on satellites already in orbit. For example, when engineers with Raytheon Co. were looking for an inexpensive system that would help emergency responders and soldiers coordinate their actions after a natural disaster or terrorist strike, they came up with the Mobile Enhanced Situational

Awareness Network (MESA). MESA would get a dedicated channel on XM's satellites that would be accessible only on devices given to emergency personnel.

The digital transmissions have enough bandwidth to carry maps and other imagery, which would be displayed on portable computers that plug into the satellite receivers. And the system can be programmed to relay information just to specific devices if need be. While XM's service only reaches North America, Raytheon has signed on with Worldspace Corp., a satellite radio provider in Africa, Asia and Europe, for global coverage.



Sept 10: Lowell, MI - GRAHamfest 2005 (Grand Rapids Area Hamfest) at Kent County Fairgrounds. (Hwy 1-96 exit #52, north 4 miles to fairgrounds), 8am-1pm, admission \$6, Talk-in 147.26+ (94.8 Hz) and 146.52 simplex. Exams (10am). Contact Jack Amelar NY8D grahamfest05@w8dc.org evenings (616)897-6885 <http://www.w8dc.org/swap.htm>

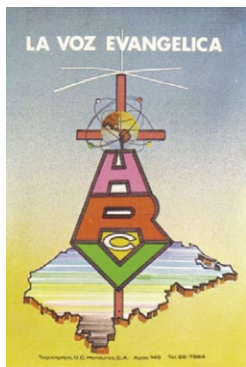
Sept 17: Loveland, CO - Northern Colorado ARC Fall Hamfest at the McMillen Building (at the old Larimer County Fairgrounds, 700 S. Railroad Ave), 8am-1pm. Talk-in 145.115 (-100Hz CTCSS) and 146.520 Simplex. Admission \$5, first table free. Exams at 10:00am SHARP. Information: Willis Whatley, WA5VRL (970)407-6599, willis.whatley@AEI.com, <http://www.qsl.net/ncarc>.

Sept 17: Elk Grove Village, IL - W9DXCC Convention and Banquet (Holiday Inn); call Mark Potter (630) 682-4678 or email w9uz@arrl.net. Details at <http://www.w9dxcc.com>

Sept 17-18: Virginia Beach, VA - Virginia Beach Hamfest at Virginia Wesleyan College (1584 Wesleyan Drive), 9am-5pm Sat, 9am-3pm Sun. For more information visit <http://www.vahamfest.com>, email hamfest@exis.net or fax 757-486-0757

Sept 18: Newtown, CT - Western CT Hamfest at Edmond Town Hall (45 Main Street), Talk-in 147.300 P: 100.0. Set up 7a.m., public 8 am-12:30pm, admission \$5, tables \$12.50, tailgating \$8. Contact Bill Schaefer N1PJG, 63A Taylor Ave, Bethel CT 06801, (203) 798-2831, <http://www.danbury.org/CARA>

"Communications" is compiled by Rachel Baughn KE4OPD (editor@monitoringtimes.com) from news and clippings sent in by our readers. Many thanks to this month's contributors: Anonymous, Azizul Alam Al-Amin, Brian Cathcart, Mark Cobbledick, Ed Cummings, Norman Hill, Ian G3ZHI, Sterling Marcher, John Mayson, Fred Moore, Ed Muro, Stephen Newlyn, Jerry None, Michael Reynolds, Doug Robertson, Brian Rogers, Robert Thomas, and Larry Van Horn.



Voices from the Banana Belt

By Gayle Van Horn, W4GVH

There was a time when a listener could be an armchair witness to a revolution by radio while monitoring broadcast stations from Central America. A typical scenario would find the regularly scheduled programming interrupted by an extended period of military music interspersed with “atención, atención.”

For the next ten minutes, over the music, you were likely to hear, “stay tuned for an important announcement,” followed by the announced radio tune-in time or television channel number. To the listener, this signaled an impending news event and an opportunity to log other regional stations covering the situation.

At the scheduled time, the president (or the new president, depending on the failure or success of the coup d’état) would come on the air. The message would be repeated at various intervals until the station deemed it appropriate to return to normal programming. The listener was left to speculate whether this was truly a revolución or a dispute that would be settled the next day.

Things are not as dramatic today in Central America, but there is still plenty to monitor. Seven countries are broadcasting in the region, three are active on shortwave. New stations periodically sign on and favorites reactivate as aging equipment or parts are replaced. Special holidays also present an excellent opportunity time to peruse the tropical bands (2300-5060 kHz) for new stations.

Our first stop is Costa Rica, or the “Rich Coast.”

Costa Rica

One of the smallest of the republics and the most prosperous, Costa Rica is unique in having a population which consists of blancos – people of mixed Spanish and other European origins.

Rumored by the Spanish to contain huge gold deposits, the explorers found little in mineral wealth, but they remained until 1821 when Costa Rica and other Central American countries left Spanish rule. With borders on both the Caribbean Sea and the North Pacific Ocean, Costa Rica lies between Panama and Nicaragua.

Some of the oldest shortwave broadcasters in Central America are from Costa Rica. Old favorites **Radio Reloj**, **Radio Impacto**, **Radio Casino**, and **Radio Rumbo** are now inactive.

Until July 2004, when they ceased opera-

tion on shortwave, most listeners’ first log from Costa Rica was **TIFC**, **Faro de Caribe**, “the Light of the Caribbean.” The station retains a medium wave and FM presence in a religious format promoting moral and spiritual teachings of the Christian doctrine. Programming is 24 hours from studios in San Jose. Medium wave broadcast are on 1080 kHz and FM 97.1 MHz, and are available on the internet via Real Audio at: <http://www.farocaribe.org>

Nowadays, the first broadcast you hear from this region may be the **University Network**. Broadcasting has continued since the death of its founder and pastor Dr. Eugene Scott on February 21, 2005. Known as “Doc” by his supporters, he lived a lavish lifestyle of chauffeured limousines and a traveling entourage. He was an active philanthropist, author, and ordained minister for over 40 years. He raised horses from his ranch in Kentucky, and the University Network Equestrian Team competed in charity horse shows worldwide.

Doc’s ministry delved in subjects ranging from the Pyramids, Atlantis, and basic straight-talk Bible teachings interspersed with rock music and quasi-entertaining banter with a studio audience or church congregation.

Doc’s ministry, now in the hands of his widow Melissa Scott, continues his legacy. With an extensive audio and video library, the shortwave world could hear the strains of Doc or Melissa for decades. A television ministry may be viewed 24 hours on line at <http://www.drgenesccott.com> or via satellite on the Ku-band Telstar 6, transponder 7. On shortwave, Scott’s ministry will likely continue from Anguilla’s Caribbean Beacon outlet. Costa Rica’s University Network is active with the following schedule:

University Network
 0000-0600: 5030 6150 7325 9725
 0600-0900: 5030 6150 7375 11870
 0900-1200: 5030 7375 9725 11870 13750
 1200-1600: 9725 11870 13750
 1600-2000: 11870 13750
 2000-0000: 13750

University Network has never verified listener reception reports, but that policy could change with a friendly letter.

Radio For Peace International, once a shortwave voice for global issues, is now available via on-demand audio at <http://www.rfpi.org/>.

Broadcasts continue to promote human rights, social justice issues and global awareness. James Latham, General Manager, predicts the station will return to shortwave in the latter part of 2005.

An easy one to log and verify from Costa Rica is from Spain’s **Radio Exterior de España** relay facility in Cariari. Spanish programming targeted to Central and North America is audible at 0300-0600 UTC: 3350 kHz; 0000-0400: 6020; 1500-1500 (Sun): 17850; 1600-1800 (Sat/Sun): 17850; 2000-2300: 17850. Reports with return postage should be sent to: Radio Exterior de España-Cariari Relay Station, Cariari de Pococoi, Costa Rica.

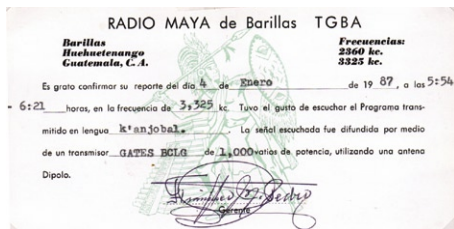
Radio Universidad de Costa Rica has been recently heard on 6105 kHz. Their hours of operation include 0000-0600 and 1300-2300 UTC. Reports are accepted in English or Spanish with one U.S. dollar or mint stamps/International Reply Coupons (IRC).

Possible targets for DXers also include Costa Rica’s medium wave stations. Four stations are routinely logged and they broadcast 24 hours. **TIUCR-Radio Universidad**, San Pedro Montes de Oca 870 kHz; **TICS-La Nueva Radio Alajuela** (ex Premium Radio) 960 kHz; **TILC-Radio La Fuente Musical** 1300 kHz; and **TICA-Radio Celestial** 1360 kHz. Look for nightly relays of Visión Christiana programming on Radio Celestial. If corresponding, include mint Costa Rican postage and consult the Address List in Table One.

Guatemala

Just below Mexico is Guatemala. Natives call it the “Land of the Quetzal” after the country’s native bird and emblem. The early history of the country was molded by the Mayan civilization, which created what might well be regarded as the most advanced pre-conquest civilization to have existed in the Americas.

Guatemala, as in earlier times, remains a culturally divided nation of Mayans and Ladino people of mixed Indian and Spanish heritage. The Ladinos live in the eastern and western regions, along the southern coast, and in Guatemala City. The Mayans live primarily in small rural towns in western and central Guatemala. Since the early 1960s, the relationship between the two has occasionally escalated to guerilla war, with each



protecting its own holdings and neither trusting the other.

At one time, extremists believed the Catholic Church was working to help the Mayans and that its members were agents of the guerillas. Kidnapping and murder of civic and church leaders occurred in communities scattered across Guatemala. Today, the country remains divided as each group struggles to protect its rights.

Guatemala, by law, licenses no commercial shortwave broadcasters; all stations broadcast in either a Roman Catholic or Protestant religious format. The majority of the stations are situated within the interior of the country to serve the varied groups of Mayan Indians, and they broadcast in Spanish and local languages including Quiché, Kekchi and Mam. Besides religious programming, most Guatemalan stations play occasional marimba music, a characteristic that makes it easier to distinguish stations from this country.

Due to its close proximity to the U.S., Guatemala is easy to hear using a portable radio's whip antenna. Table top receivers will provide more consistent and stronger reception. Shortwave stations broadcast mornings from 0900-1100 UTC (0400-0600 a.m. local time) and can be heard until their local dawn. In the evenings, depending on seasonal conditions, signals will fade in from 2200 to 0400 UTC.

All Guatemalans operate within the tropical shortwave bands of 2300-5060 kHz. Thanks to extended darkness paths, these "lower bands" will have propagation paths favorable to the U.S. during North American winter months. This should not, however, discourage hobbyists from monitoring Guatemala anytime. If the frequency is overpowered by summer or mid-season static, try checking later in the evening just prior to sign-off or during a morning DX session when static is at a minimum.

Until recently, the most consistently heard station on shortwave from Guatemala was **Radio Cultural (TGNA)** from Guatemala City. Their clear channel and regular Spanish and English broadcasts were easy to hear and identify on 3300 kHz. TGNA is a powerful voice of evangelism to a national audience on medium wave (730 kHz) and FM (100.5) from 9:00-10:30 pm local time. As their name implies, the station's mission includes educational programs of culture and information, classical music, news, and public affairs.

In recent months, shortwave reception on 3300 kHz has been sporadic and weak, fueling the rumors of Radio Cultural's demise on shortwave. It's worth a check as you scan the dials from 0200-0500 and 0950-1100 UTC. To learn more about Radio Cultural, consult their multilingual website at: <http://www.radiocultural.com/>

Similar to Radio Cultural has been the seeming disappearance of **La Voz de Nahualá (TGVN)** from shortwave. TGVN is run by the

Catholic Church from the small, isolated village town of Nahualá.

In 1959, Catholic church leaders visited Nahualá and found a need for an educational station in the local Quiché language. The station, founded by the Catholic Diocese of Spokane, began broadcasting November 21, 1962, as the first voice of cultural-education for the farmers in the Sololá department.

Logs of this station have been intermittent as of this writing, but this remains a station worth checking during holidays or special events on 3360 kHz, in Spanish and Quiché. When active, Radio La Voz de Nahualá broadcasts on Monday-Friday from 0100-0400 UTC. Spanish correspondence is preferred with mint Guatemalan postage stamps, as IRCs are useless in the isolated Sololo countryside.

Radio Buenas Nuevas (TGMI), located in San Sebastián, Huehuetenango, sits about 40 miles from the Mexican border at the base of the Cuchumatanes mountains in northwestern Guatemala. The station began broadcasting in 1987 at a 250 watt recording studio with Mam language programs on Radio Maya de Barillas. During the next year the station progressed to 1,000 watts, and they are now in their own studio, using a Gates BC-IT AM transmitter.

The Mams are descendants of the Mayans, representing one of four Indian groups of the nation. The Mam Evangelist Church, seeking to appeal to the Indians, decided to apply for a station license to provide a method of evangelization, and they achieved their goal within four years.

The station is located within a compound that includes a health clinic, community buildings, and housing to several families of the staff. Radio Buenas Nuevas broadcasts in Mam and Spanish on 4800 kHz (v. 4799.8 kHz) at 1930-1545 and 2130-0230 UTC. Get this while you can, as they may soon shift to an FM-only service. Return postage or currency is appreciated using Spanish reports, and responses normally include station information and free religious literature.

Radio Maya de Barillas (TGBA) is located in northern Huehuetenango department in Barillas. Founded in 1962 by American Evangelist Missionaries, Radio Maya is the most remote evangelical station in Guatemala. A visit to the station, located off the main roads, will require a bus or four wheel drive jeep over poor dirt roads and usually takes 12-18 hours.

The station is run by the Canjobel Evangelist church. These people are descendants of the Canjobel Indian tribe of Guatemala. Radio Maya's programming is mainly in Spanish and the Indian language K'anjobal, broadcasting a variety of educational, cultural, and health issues targeted to the Indian peasants in the northwest regions of the country.

Radio Maya de Barillas is consistently monitored on 3325 kHz from 0900-1230 and 2100-0330 UTC. Station personnel are interested in receiving reception reports, preferably in Spanish. Currency or Guatemalan postage stamps are advised since IRCs are useless in this remote countryside.

Radio Cultural Coatlán (TGLT), on 4780 kHz, is broadcast from Coatlán, in the Huehuetenango department. The station began broadcasting in 1994 from a disgruntled group

of employees from Radio Maya de Barillas. Known as a marginally legal station, there is no reported record, according to the government, of any sort of license – plus the station has used the "Cultural" name for years, although not a part of the Radio Cultural network. The station is actively heard from 1034-1500 and 2200-0230 UTC. Spanish letters may be sent to the station's Coatlán address.

In mid-March 2000, MT's Glenn Hauser discovered a Guatemalan evangelical station, **Radio Verdad (TGAV)**, on out-of-band frequency 4052.5 kHz. The station's full name is Estación Educativa Evangelica Radio Verdad, and it is located in rural Chiquimula, near the border with Honduras.

Radio Verdad uses 610 watts into a bi-pole wave antenna oriented northeast/southwest and transmits in English and Spanish from 1110-0600 UTC. English has been logged from 0500-0557. Letters may be sent in English or Spanish with currency or mint stamps. Most responses are full data cards and a personal letter with an occasional pennant.

Radio Amistad, from San Pedro La Laguna, began broadcasting in 1999 from a small control room in the tower of the church's steeple. Sponsored by Iglesia Bautista Getsemani, the station moved in 2001, to a new studio and office complex, thanks to volunteer construction volunteers from Florida and North Carolina. Hours of operation are 1100-0200 UTC on 4700 kHz (4698.7 v) and 90.7 FM in Spanish and Indian dialects. Confirmations are via a QSL certificate and form letter. Correspondence is accepted in English or Spanish with currency or mint postage stamps.

Unfortunately, several former favorites from Guatemala are currently inactive, due to old equipment, lack of operational funds, or a shift to AM and FM services for local coverage. It is still worth checking for **Radio Chortis** (3380 kHz) and **Radio Ke'kchi** (4845 kHz) for special holiday programming or if current affairs warrant such. Should either resurface, their addresses have been included in Table One.

Despite a decrease in the country's broadcasting presence, there remains plenty to log from the land of the Quetzal. Try some shortwave band scanning and you're likely to hear a few from this country.

Honduras

Named in Spanish for the deep waters off the north coast, Honduras is a tropical country that bases its economy on that long, yellow fruit known as the banana. Like Guatemala, Honduras formed part of the lands occupied by the Mayans, and the ruins of one of their major cultural centers can be seen at Copán in the extreme west of the country. Despite their successful export, Honduras remains a poor country with minimal resources in the way of industry.

The majority of the people are of Indian and Spanish ancestry, called Mestizos, who cling tightly to their religious beliefs, both Catholic and Protestant. In fact, the broadcasting scene from this banana republic still plays an important role in the daily life of the population.

Honduras once was the site of clashes between troops of the Nicaraguan Sandinista government and the Nicaraguan rebel contras.

Table One: Address List

COSTA RICA

Radio Exterior de España-Cariari Relay Station
Cariari de Pococi
Costa Rica
<http://www.ree.rne.es>

TIUCR-Radio Universidad de Costa Rica
Apartado 1-06
2060 Universidad de Costa Rica
San Pedro de Montes de Oca, San Jose, Costa Rica
<http://cariari.ucr.ac.cr/~radioucr/radioucr>

University Network
P.O. Box 1
Los Angeles, CA 90053
USA
<http://www.drgenescott.com>

TICA-Radio Celestial (AM)
Apartado 6462
1000 San José, Costa Rica

TICS-La Nueva Radio Alajuela (AM)
100 metros Norte
50 metros al Oeste
entrada de Emergencia del Hospital Calderón Guardia
1000 San José, Costa Rica

TIFC-Faro del Caribe (AM/FM)
Apartado 2710
1000 San Jose, Costa Rica
<http://www.farodelcaribe.org>

TILC-Radio La Fuente Musical (AM)
Apartado 596
7050 Cartago, Costa Rica

TIUCR-Radio Universidad (AM)
Rodrigo Facio 2060
San Pedro de Montes de Oca, Costa Rica

EL SALVADOR

YSDA-Radio Imperial
Apartado 56
Sonsonate, El Salvador

YSTS-Radio El Mundo (AM)
Apartado 06-210
San Salvador, El Salvador
<http://www.radioelmundo.sv>

GUATEMALA

TGVN-La Voz de Nahualá (when active)
Nahualá, Sololá, Guatemala

Radio Armistad
c/ David Daniele
Aseor de Comunicaciones
Apartado Postal 25
Buleros MX, 53140 Mexico
(or) Iglesia Bautista Getsemani
San Pedro La Laguna, Guatemala

TGAV-Radio Verdad
Apartado Postal 5
Chiquimula, Guatemala

TGCH-Radio Chortis (when active)
Centro Social
20004 Jocotán, Chiquimula, Guatemala

TGMI-Radio Buenas Nuevas
13020 San Sebastián
Huehuetenango, Guatemala

TGLT-Radio Cultural Coatán
San Sebastian Coatán, Guatemala

TGVC-Radio K'ekchi (when active)
3ra Calle 7-15
Zona 1
16015 Fray Bartolomé de las Casas
Alta Verapaz, Guatemala

TGBA-Radio Maya de Barillas
13026 Villa de Barillas
Huehuetenango, Guatemala

TGNA-Radio Cultural (AM/FM)
Apartado 601
01901 Guatemala City, Guatemala
<http://www.radiocultural.com>

HONDURAS

HRQ02-Radio Costeña
c/o Radio Ebenezer 1220 AM
Apartado 3466
San Pedro Sula, Honduras
<http://www.ebenezer.hn>

HRMI-Radio Misiones Internacionales
Apartado Postal 20583
Comayaguela, M.D.C., Honduras
(or) IMF World Missions
P.O. Box 6321
San Bernardino, CA 92412 USA

HRLW-Radio Litoral
Apartado Postal 888
La Ceiba, Provincia Atlántida, Honduras

HRPC-Radio Luz y Vida
Atención: Donald Moore
P.O. Box 303
San Pedro Sula, Honduras

HRVC-La Voz Evangélica (AM/FM)
Apartado Postal 3252
Tegucigalpa
M.D.C. Honduras

NICARAGUA

YNPMK-Radio Miskut (when active)
Barrio Pancasan
Puerto Cabezas, R.A.A.N., Nicaragua

YNN-Radio Nicaragua (AM)
Apartado 4665
Managua, Nicaragua
(or) Contiguo a TELCOR
Villa Fontana, Nicaragua

YNRS-Radio Sandino "La S. Grande" (AM)
Apartado 4776
Managua, Nicaragua
(or) Paseo Tiscapa este
Contiguo al Restaurante Mirado
Managua, Nicaragua
<http://www.lasandino.com.ni>

Radio Corporación (AM)
Apartado 2442
Managua
(or) Ciudad Jardín
Casa Q-20, Managua
<http://www.rc540.com.ni>

The rebels used Honduras as a base from which to organize raids into Nicaragua. Shortwave provided opposing voices from the privately owned station **Radio 15 de Septiembre** and the anti-Sandinista clandestine **Radio Miskut**.

Today, radio is represented by evangelical stations. **HRPC-Radio Luz y Vida** (Light and Life Radio) is located near the edge of San Luis, a small town in the Santa Barbara department. Established by missionary and amateur radio operator Don Moore, Luz y Vida began broadcasting in 1979 on 1600 kHz medium wave with 50 watts. Next year it will be replaced with a 250 watt transmitter.

The station commenced on shortwave within its first year on 3250 kHz (v.3249.8) to cover a larger listening audience. The HRPC transmitter ("PC" stands for "Proclaiming Christ") was "home brew," based on a Gates model BC-400 transmitter. By 1983, the shortwave transmitter (which was given to the Hawaiian Broadcasting Service) had been replaced by a Gates BC1J transmitter with 1 kW of power.

DXers continue to log and verify Radio Luz y Vida on 3250 kHz, 2200-0357; 1100-1600; and on medium wave 1600 AM kHz until fade out depending on your location. Send your return postage and Spanish or English letter to the attention of Director de Emisora Donald R. Moore.

HRVC-La Voz Evangélica, on 4820 kHz, was the first Honduran station I logged and verified. The studio is located in Comayaguela, a neighboring city of Tegucigalpa, and is housed within a modern three-story building. Broadcasting facilities house AM, FM, and satellite programming. Shortwave transmissions appear to be irregular at the moment, and the station may be inactive on 4820 kHz. Real audio is available at: <http://www.hrv.org>. Always an active verifier, reports are accepted in English, Spanish, German, and Portuguese. Return postage or one US dollar is required for a reply. IRCs are not recommended as they are reportedly unable to redeem them in Honduras. HRVC's medium wave service transmits on 1390 kHz 24 hours.

A few more Hondurans to try for include **Radio Costeña (HRQ02)** on 4930 kHz, a relay of Radio Ebenezer's 1220 kHz medium wave station. The station broadcasts irregularly from 0000-0500 UTC and 1300-2200 UTC. Two identifications have been noted: "Radio Ebenezer 12-20" and "Radio Sula Internacional." Spanish letters should be sent to the Radio Ebenezer's address.

Radio Litoral (HRLW) is active from La Ceiba. Programming is in Spanish and Miskito language on 4830 kHz (4832v). Spanish reports have been rewarded with letters, scenery cards and a large paper Certificado De Sintonia certificate. Spanish and English programming of religious and local fare are heard from 0000-0600 and 1100 to 2300 UTC. Depending on your location, look for a fade-out by 1200 UTC and check for those early evening signal fade-ins by 2300 UTC.

HRMI from the capital Tegucigalpa is being heard on 3340 kHz around 0100 UTC as "**Radio Misiones Internacional**" (or "Radio MI"). The station has left the air and been reactivated several times. Regional programming

includes local greetings, religion, news, and local interest items. Corrido music, a narrative style ballad, is played regularly and is one of the most popular music styles in the Latino market. Their identification is usually heard as, "esta es Rádio Litoral transmitiendo desde la ciudad de La Ceiba en 4830 kc, banda internacional de 60 metros." Currency or return postage should be enclosed with a Spanish or English letter for reception reports.

Partially Active Stations

The remainder of Central American countries pose a greater challenge to monitoring.

If you logged and verified Belize Radio One on shortwave during the 1980s, consider yourself lucky. Now FM outlets of the **Belize Broadcasting Network**, a government operated, semi-commercial broadcasting system, provide all the broadcasting activities in the country. FM outlets from Belize City include: **Radio Krem** 96.5 MHz; **Love FM** 107.1 MHz <http://www.lovefm.com>, **BFBS Radio One** 99.1 FM, and **Radio Two** 93.1 MHz (<http://www.ssvc.com/bfbs/radio/belize/>).

Broadcasting from El Salvador during the revolución days provided a successful voice of communications for the guerillas fighters in that country. Some DXers have verifications from **Radio Venceremos**, or **Radio Farabundo Martí**. Both stations were anti-government guerilla shortwave stations during the turbulent 1980s. Each station relied on a network of correspondents scattered throughout the country, who lived among the peasants and many of whom followed the guerrillas into battle. It was revolution by radio at its best.

Today, when active, **Radio Imperial (YSDA)** has been logged on 17835 kHz at 1200-0500 UTC. Numerous mediumwave and FM stations cover the country. Radio El Mundo (YSTS) from San Salvador is occasionally logged on 1140 AM kHz from 0200-0230 UTC.

Just as interesting were the shortwave broadcasts from Nicaragua during its turbulent days. **La Voz de Nicaragua** was the government voice of the country and the only station with an international voice. Its opposing voice was **Radio Sandino** as the Voice of the Sandinista National Liberation Front. It was the mouthpiece of the FSLN's effort to overthrow the Somoza government and provided many hours of broadcast programming.

Nicaragua's shortwave scene today is irregular, at best, with broadcasts from **Radio Miskut (YNPMK)**. Scheduled hours are 1200-0000 on 5770 kHz. If you report this station, enclose mint stamps or a suggested two dollars U.S. via registered mail. Three medium wave stations to try for include: **Radio Nicaragua (YNN)** on 620 kHz, 0955-0600 UTC; **Radio Sandino (YNRS)** 740 kHz, 1040-0400 UTC; and **Radio Corporación (YNOW)** 540 kHz, 0900-0600 UTC.

In previous years, Panamá matched its importance in the world with a thriving shortwave presence. **Station HOF31** on 9685 kHz was owned by Panamá's largest network, Radio Programas Continental. During those years, "yankee go-home" feelings would arise from time to time over the Panamá Canal, resulting in a surge of anti-Americanism. Unfortunately, this meant dif-

ficulty in QSLing Panamanian stations. Those of us not so fortunate to have verified a Panamanian back then, can only hope (or speculate) that someday Panamá may reactivate their shortwave service but it's doubtful. Panamá's extensive medium wave network is under the Asociación Panameña De Radiodifusión.

For further study

For more information on Panamá's current radio presence in the AM and FM bands, as well as others from Central America, the *Grove Radio Television Broadcast Directory* on CD-Rom, by Larry Van Horn, is an excellent source. The AM broadcast (530-1700 kHz) and FM (88.1-107.9 MHz), and television listings are covered. This handy reference lists frequencies, call signs, location, antenna configuration and power output for day/night service, plus Internet sites for radio clubs.

Additional reference sources available from Grove Enterprises (<http://www.grove-ent.com>) that can assist listeners in Central American band scanning with frequencies and programming schedules include the *World Radio TI Handbook* and *Passport to World Band Radio*. For by-frequency listings, consult the Klingenfuss Shortwave Frequency Guide (<http://www.klingenfuss.org/homepage.htm>) or the Danish Short Wave Club International Domestic Broadcasting Survey (<http://www.dswci.org/>) reviewed in July 2005 *Monitoring Times*. All of these sources are recommended, since the station information included in them has been gathered and monitored by experienced collaborators and monitors worldwide.

Most Central American stations are average verifiers and tend to respond with extra "goodies," much to the delight of collectors. A self-addressed envelope is an excellent idea, and enclosing some mint postage stamps of the country will assist your reply. Send a self-addressed stamped envelope (SASE) to Bill Plum's Airmail Postage Service for a current international stamp price list (12 Glenn Road, Flemington, NJ 08822, USA). The Address List in Table One will assist your quest in confirming the stations you monitor from this region.

There is still plenty to hear from Costa Rica, Guatemala and Honduras. These three countries provide the majority of monitoring opportunities and each offers an interesting focus on the diverse cultures they serve. There is certainly plenty to keep you busy bandscanning for hours in the shortwave radio bands.

Don't forget to recheck those formerly active frequencies. Occasionally, a new or familiar voice will reappear and this usually sets the radio community into a frenzy.

So what do we see in the future for radio from Central America? Will Guatemala or Honduras see more religious stations in the untouched remote regions of the country? Will other stations follow Spain's path and build new relays in Costa Rica? Are the days of revolution by radio truly over? The future for shortwave remains uncertain in the banana belt of Latin America. It is however, another fascinating area of our world to explore and enjoy.

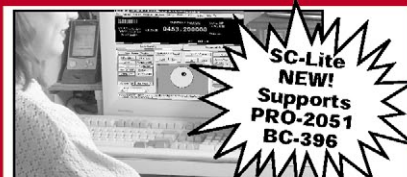
QSLs are from the author's collection.

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Listening to the Flight Testers

NAS Patuxent River

By Ron Perron

Living just south of Baltimore, Maryland, I have a pretty good location for some interesting listening. One of the more interesting places I can hear is the Navy's Flight Test Center at the Naval Air Station at Patuxent River, Maryland, about 60 miles southeast.

Before I delve into the article let me put forth a couple of caveats: Most of the non-technical information was taken from publicly available US Government web sites. The frequency information is derived from my own monitoring as well as a valuable contribution from one of our local listeners. Some of the aircraft identifications are taken from photos, my visits to NAS Patuxent River (before Sept 11, 2001) and from spotters in other parts of the country. To my knowledge no classified information was used in the preparation of this article.

As with any article covering this much "territory," the information was current as of July 2005. Some of it may have changed by the time this article appears in print.

Background

Recognizing the need for consolidation of the Navy's flight test efforts, NAS Patuxent River was established on April 1, 1943. Its proximity to the coast, freedom from air traffic congestion (at that time), and isolation made it ideal for testing of classified projects. On June 16, 1945, the Navy officially designated "Pax" as the Naval Air Test Center. It has since evolved into the center of excellence for naval aviation.

The Pax River complex includes the Webster Field Outlying Field (OLF) Annex and Bloodsworth Island. The "Pax" complex includes the Naval Air Systems Command (NAVAIR), the Naval Air Warfare Center Aircraft Division (NAWCAD) and approximately 50 tenant activities. The complex also encompasses several Special Use Airspaces [SUAs] and a range complex which is the largest such overland area on the East Coast – but more about these later.

Major air units at Pax River include:
 Naval Force Aircraft Test Squadron (NFATS), VX-20
 Naval Strike Aircraft Test Squadron (NSATS), VX-23
 Naval Test Pilot School (NTPS)
 Naval Rotary Wing Aircraft Test Squadron (NRWATS), HX-21
 Naval Air Test and Evaluation Squadron One, VX-1
 Naval Scientific Test Squadron, VSX-1
 Air Operations Detachment (AOD)

Naval Force Aircraft Test Squadron VX-20

Since the earliest days of its inception, VX-20 has been instrumental in the advancement of aircraft technology and its integration into fleet assets. These new capabilities delivered to the fleet mean greater safety for aircrews and enhanced mission effectiveness. VX-20 has been responsible for the test and evaluation of completely new aircraft prior to their introduction to the fleet – including the E-6A, the T-44A, the UC-12, and the ES-3.

The squadron also tests and evaluates major aircraft modifications such as the P-3 Updates I, II, and III; the E-2/C-2 T56-A-427 engine upgrade; the S-3B developmental testing; E-6B Airborne Command Post (TACAMO) modification; and T-34 Naval Aircraft Collision Warning System.

VX-20 continues to be an integral player in the advancement of naval aviation, intimately involved in the developmental test of future aircraft technologies and modifications. Ongoing test programs include the E-2 Hawkeye 2000 and 8-bladed propeller upgrades; the P-3 Anti-Surface Warfare Improvement Program (AIP); Ocean Water Laser Detection and Ranging; the S-3 Standoff Land Attack Missile Extended Range (SLAM-ER); Digital Flight Data Computer; the T-6 primary trainer aircraft; the C-40 fleet logistics aircraft; and the KC-130J.

VX-20 Aircraft Test Squadron Platforms include the C-130 Hercules; C-2A Greyhound; E-2C Hawkeye; E-6 Mercury; P-3C Orion; S-3 Viking; T-34C Turbomenter; and T-6 Texan (JPATS).

When working with Pax River entities, VX-20 aircraft use the callsign Water Bug. When working with other ATC entities or traveling out of the "Pax" area, they use the callsign Navy Whiskey Bravo ##. I have identified the following VX-20 aircraft. [NOTE: In this and the other callsign lists, callsigns without an identification

are those I have heard but could not determine type of aircraft. Each aircraft's serial number or bureau number (BuNo) is given where known.]

Callsign	Aircraft Type # Serial Number or BuNo	possible V-22 Osprey
Water Bug 000		
Water Bug 022		
Water Bug 100		
Water Bug 105	KC-130R	
Water Bug 109	E-2C 164109 - SIRST-infrared search & track system	
Water Bug 110	E-2C HAWKEYE 164110	possible E-2C
Water Bug 112		
Water Bug 129		
Water Bug 141		
Water Bug 142	C-2A 162142	
Water Bug 150	NP-3D 152150	
Water Bug 157	NC-130H Radar Modernization Program Test Bed	
Water Bug 165	F-18E 161165	
Water Bug 180		
Water Bug 204	NP-3C Test bed 158204	
Water Bug 209		
Water Bug 210		
Water Bug 266	NT-34C 160266 - slow chase plane	
Water Bug 277		
Water Bug 284	possible chase plane	
Water Bug 290	P-3C 160290 P-3C USD-II.5	
Water Bug 291	P-3C 160291	
Water Bug 294		
Water Bug 296		
Water Bug 298		
Water Bug 308		
Water Bug 320		
Water Bug 406	E-6B 164406	
Water Bug 408	E-6B 164408	
Water Bug 409	E-6B 164409	
Water Bug 410	P-3C 161410	
Water Bug 442		
Water Bug 511		
Water Bug 525		
Water Bug 527		
Water Bug 528		
Water Bug 535	E2C 163535 NP2000	propeller test bed
Water Bug 536		probable EA-6B Have Quick
Water Bug 537	E-2C 163537	
Water Bug 547	EA-6B- 159547	
Water Bug 565		
Water Bug 567	E-2C	
Water Bug 568		
Water Bug 587		
Water Bug 592		
Water Bug 606	E-2C Water Bug 625	
Water Bug 714		
Water Bug 715		
Water Bug 732		
Water Bug 738	C-130J	
Water Bug 739	C-130J	
Water Bug 743	P-3C 152743	
Water Bug 760		
Water Bug 762	KC-130T 164762	
Water Bug 763	KC-130T 164763 - new "Fat Albert"	



VX-20 T-45 flying with EA-6B and F-18s from VX-20

Water Bug 764	probable KC-130	
Water Bug 766		
Water Bug 770	P-3C	162770
Water Bug 773		
Water Bug 774	P-3C III	162774 RD 04
Water Bug 776		
Water Bug 788	T-45C	162788
Water Bug 791		
Water Bug 804	SH-60F	164804
Water Bug 806	KC-130F	149806
Water Bug 831	Unk	
Water Bug 836	T-34C	
Water Bug 849	E-2C	163849 Hawkeye
	2000	
Water Bug 883	NP-3D	148883
Water Bug 889	P-3C	159889
Water Bug 895	probable P-3C	
Water Bug 897		
Water Bug 899		
Water Bug 905		
Water Bug 912	P-3C test bed	158912
Water Bug 922		
Water Bug 929		
Water Bug 939	T-34C	160939
Water Bug 940	V-22	164940 Osprey
	8	
Water Bug 941	V-22	164941- at Edwards AFB
Water Bug 942	MV-22B	164942
Water Bug 958	T-6A	165958
Water Bug 977		
Water Bug 982		

Naval Strike Aircraft Test Squadron VX-23

VX-23 is the Naval Air Systems Command's largest flight test organization. Their mission is to support the research, development, test and evaluation of fixed wing tactical aircraft by providing aircraft and pilot assets, maintenance services, safety oversight, and facility support for these efforts. Primary areas of support include flying qualities and performance evaluations, shipboard suitability, propulsion system testing, tactical aircraft mission systems testing, ordnance compatibility and ballistics efforts, reliability and maintainability assessments, flight fidelity simulation, and flight control software development. The Squadron also provides Government Flight Representatives, test monitoring, chase aircraft support, and facilities for contractor demonstration, validation, and development work involving tactical aircraft and associated systems.

VX-23 consists of about 40 officers (Navy, Marine Corps & Foreign), 335 enlisted (Navy & Marine Corps), and 240 contractor and civil

servant personnel directly involved with maintenance, planning, safety oversight, and support of the Squadron's 30 F/A-18 A/B/C/D/E/F, EA6B, T-45A/C, and X-31 aircraft.

The Squadron conducts over 3,000 flight operations annually, totaling about 5,000 flight hours, much of which involves high-risk flight testing. VX-23 conducts operations from a facility that includes three large hangars and also operates and maintains a TC-7 catapult and MK-7 arresting gear facility.

Naval Strike VX-23 Aircraft Test Squadron Platforms include: EA-6B Prowler; F/A-18 A-D Hornet; F/A-18 E/F Hornet; F-14 Tomcat; Joint Strike Fighter (X-35); RQ-2A Pioneer Unmanned Aerial Vehicle (UAV); T-45A Goshawk; and the X-31 VECTOR.



When working with Pax River entities, VX-23 aircraft use the callsign Salty Dog. When working with other ATC entities or traveling out of the "Pax" area, they use the callsign Navy Sierra Delta ###. The following are the VX-23 aircraft I have identified:

Callsign	Aircraft Type	#	Serial or BuNo
Salty Dog 100	F/A-18C		
Salty Dog 101	F-18	163476	
Salty Dog 102	F-18C	163706	
Salty Dog 103	probable F-18		
Salty Dog 104	F/A-18		
Salty Dog 105	F-18	163093	
Salty Dog 106			
Salty Dog 107	F-18A	162437	
Salty Dog 110	F-18A	163148 JPALS test bed	
Salty Dog 111			
Salty Dog 112	F/A-18		
Salty Dog 114	F-14 (chase)		
Salty Dog 120	F/A-18B	163434	
Salty Dog 121	probable F-18		
Salty Dog 122	probable F-18-instrumentation test bed		
Salty Dog 123	F/A-18D	164040	
Salty Dog 124	probable F-18 (weapons test platform)		
Salty Dog 125	F-18		
Salty Dog 127	probable F-18, weapons test platform		
Salty Dog 165	F/A-18E	165165	
Salty Dog 166	F/A-18F	165166	
Salty Dog 201	F-14A	159455 (museum)	
Salty Dog 202	F-14		
Salty Dog 203			
Salty Dog 205	F-14	159829	
Salty Dog 207	NF-14D	160658 -DFCS	
Salty Dog 213	probable F-14		



Pax River flying areas

Salty Dog 220	F-14A	161623
Salty Dog 221	F-14 (museum)	162595
Salty Dog 222	F-18	
Salty Dog 224		
Salty Dog 230	NF-14D	162412 -Primary test asset
	NF-14	163417
Salty Dog 231		
Salty Dog 243		
Salty Dog 250		
Salty Dog 300	F/A-18	
Salty Dog 301	NF/A-18	162445
Salty Dog 302	NF-18	161367
Salty Dog 305	F-18A	161709
Salty Dog 306	F-18A	161527
Salty Dog 307	F-18A	161526
Salty Dog 312	F-18	
Salty Dog 320	F/A-18B	161704
Salty Dog 321	F-18D	
Salty Dog 322	F/A-18B	161938
Salty Dog 323	probable F-18	
Salty Dog 324	F-18B	161723
Salty Dog 325	F/A-18B	162408
Salty Dog 327	F-18B	
Salty Dog 332		
Salty Dog 399		
Salty Dog 400	probable F-18 E/F	165537
	probable F-18	
Salty Dog 401	F-18 E/F	165533
Salty Dog 402		
Salty Dog 404		
Salty Dog 405	F-18	
Salty Dog 407	F-18A	
Salty Dog 411		
Salty Dog 420	F/A-18C	
Salty Dog 422	probable F-18	
Salty Dog 424		
Salty Dog 426	F-18	
Salty Dog 432	unidentified.	
Salty Dog 534	EA-6B	164403
Salty Dog 535	EA-6B	158805
Salty Dog 536	EA-6B	159609 (ICAP III test bed)
Salty Dog 537	EA-6B (Photo)-electromagnetic test bed	

Naval Test Pilot School

The United States Naval Test Pilot School (USNTPS) provides instruction to experienced pilots, flight officers, and engineers in the processes and techniques of aircraft and systems test and evaluation. The school investigates and develops new flight test techniques, publishes manuals for use of the aviation test community for standardization of flight test techniques and project reporting, and conducts special projects. USNTPS maintains its staff as a focal point of expertise providing the aviation test community



SH-60s from HX-21

with engineering and training consultation.

The curriculum has expanded to accommodate three different criteria: Fixed Wing, Rotary Wing and Airborne Systems. The United States Naval Test Pilot School is the only test pilot school in the U.S. military that offers academic courses on helicopters. In addition to having four to five foreign students in the classes annually, TPS teaches all Army and Marine pilots and has an exchange program with the Air Force. Roughly one-sixth of each class is occupied by nonmilitary students such as civilian engineers.

The Test Pilot School maintains and operates about 50 aircraft of 13 types. This squadron of aircraft – the Department of the Navy's most diverse aircraft fleet from the X-26 glider to the F/A-18B, and from the TH-6 to a variable stability Seahawk helicopter –exposes the students to a broad spectrum of performance, flying qualities, and weapon system capabilities. An NP-3D, with an F-16 radar, a Forward Looking InfraRed system, and other systems enhancements is used for systems training.

Many of the aircraft have sophisticated instrumentation systems allowing comprehensive data collection and telemetry capability. These internal assets are augmented by qualitative evaluation aircraft from other military sources and contractors. Students at TPS can expect to fly 15 to 20 different aircraft types during their year at the school. The School also maintains a simulation capability which includes a variable stability flying qualities simulator, and a variable parameter radar simulator.

The USNTPS curriculum is 48 weeks long, and a class is convened every January and July. It is a unique educational program of considerable engineering depth and project variety, designed to prepare students to meet the requirements of Navy Developmental Test and Evaluation (DT&E), Operational Test and Evaluation (OT&E) activities, and various other Research, Development, Test and Evaluation (RDT&E) activities in all U.S. military services, other U.S. Government agencies, and many foreign nations. Three curriculums provide instruction in academics, flight test preparation, flight test conduct, data collection, data reduction, and test report preparation.

The fixed-wing curriculum prepares pilots and engineers to evaluate airplane performance and flying qualities. The rotary-wing curriculum prepares pilots and engineers to evaluate helicopter and airplane performance and flying qualities. Both of these courses include instruction in airborne mission systems testing. The airborne systems curriculum is a comprehensive course in airborne mission system test and evaluation for flight officers and engineers. It also includes aircraft performance and flying qualities instruction.

U.S. Naval Test Pilot School Platforms include: AN-2 Colt; ASK-21 Glider; B-17G Fortress; Beaver (Watercraft); CASA-101 Aviojet; F/A-18 A-D Hornet; F/A-18 E/F Hornet; Fouga; JAS 39 Gripen; KA-32 Helix; KC-135 Stratotanker; L159 ALCA (Advanced Light Combat Aircraft); NU-1B Otter; OH-58D Kiowa Warrior; PITTS; SH-60 Seahawk; SK-37 Viggen; SNJ; T2C Buckeye; T-38 Talon; TF-51 Mustang; TH-6B Cayuse; U-6A Beaver; UH-60 Black Hawk; and X-26A Glider

The NTPS aircraft use the callsign Tester – to no one's surprise! Here are the Tester callsigns that I have equated to specific aircraft:

Callsign	Aircraft Type #	Serial or BuNo
Tester 00	F-18B	161356
Tester 01	F-18	161357
Tester 02	F-18D	162885
Tester 03	F-18	161707
Tester 04	F-18	161360
Tester 08	probable T-38	
Tester 09	T-38A	610825
Tester 11	T-38A	688158
Tester 12	T-38	158200
Tester 13	T-38	158201
Tester 14	T-38	674943
Tester 15	T-38	591604
Tester 16	T-38	701575
Tester 17	T-38	701579
Tester 18	T-38	
Tester 20	T-2C	157032
Tester 21	T-2C	158326
Tester 22	T-2C	158328
Tester 23	T-2C	158328
Tester 24	T-2C	158530
Tester 25	T-2C	158578
Tester 26	T-2C	158579
Tester 27	T-2C	158605
Tester 28	T-2C	
Tester 30	NU-1B Otter	144670
Tester 32	X-26 Glider	159260
Tester 33	X-26 Glider	760086
Tester 34	U6A Beaver	150191
Tester 35	U6A Beaver	164525
Tester 36	C-12C	76-0172
Tester 37	C-12C	76-22563
Tester 38	C-12C	76-23132
Tester 39	C-12	
Tester 40	TH-6B	696040
Tester 41	TH-6 Cayuse	696041
Tester 42	TH-6B	687333
Tester 43	TH-6	6916044
Tester 44	TH-6B Cayuse	651967
Tester 45	TH-6B	696061
Tester 52	UH-1/H-46	
Tester 54	OH-58C	686598
Tester 55	OH58C	696160
Tester 56	OH-58C	696186 (Army markings)
Tester 57	OH-58C	20376
Tester 60	UH-60B	8023507
Tester 62	UH-60B	77-22725
Tester 63	NSH-60B	162974
Tester 64	SH-60F	164069
Tester 70	UH-3H	148045 (SAR flt)
Tester 71	UH-3H	151550 (SAR flt)
Tester 72	H-3	154105 or 149729
Tester 73	H-3	152697 (SAR flt)
Tester 75	H-3	156489
Tester 76	H-3	154116
Tester 77	probable H-3	
Tester 443	NP-3D	153443
Tester 830	possible helo	
Tester 967	possible T-34C	

Occasionally, when working with non-Pax River ATC facilities or traveling away from "Pax", NTPS aircraft use the callsign Navy Tango Papa ##. I'm assuming that the TP stands for Test Pilot.

Although I've only heard the NTPS aircraft use the Tester and Navy TP callsigns, one of the listeners in the South has heard an NTPS aircraft use the callsign Mad Fox ##.

HX-21

The Naval Rotary Wing HX-21 Aircraft Test Squadron tests and evaluates all rotary wing aircraft including the H-1, H-3, H-53, H-60, TH-57 and V-22. Additionally, its maintenance



Water Bug 805 (C-130) from VX-20

department maintains the four NAS Patuxent River (UH/SH-3H) Search and Rescue assets.

The Naval Rotary Wing HX-21 Aircraft Test Squadron performs developmental flight testing including aircraft flying qualities, aircraft performance and aircraft systems testing. Testing of flying qualities is used to identify deficiencies related to aircraft handling qualities and their affect on mission performance. Aircraft performance testing is used to validate specification requirements and contractor compliance, as well as to obtain and develop information pertinent to mission planning and execution. Systems testing is used to validate the performance of associated aircraft systems with respect to aircraft mission performance.

The Squadron also supports dynamic interface (DI) testing. DI is used in the development of procedures and envelopes for operating rotary wing aircraft aboard ship and includes: development and/or expansion of launch/recovery and engagement/disengagement wind envelopes, electromagnetic compatibility testing, deck certification and deck strength analyses, and aircraft handling and stowage testing. DI is typically conducted aboard U. S. Navy ships at the completion of fundamental, land-based flight test, once the characteristics of the aircraft and/or system are known and quantified.

Naval Rotary Wing HX-21 Aircraft Test Squadron Platforms include: AH-1W Super Cobra; CH-46D/E Sea Knight; CH-53D Sea Stallion; CH-53E Super Stallion; H-3 Sea King; SH-60 Seahawk; UH-1N Iroquois (Huey); V-22A Osprey; and VH-3D Sea King.

The HX-21 aircraft use the callsign Black-jack. Their old callsign (before Dec 04) was Royal Flush, thus the RF modex (an identification used when away from the squadron) on the aircraft. I haven't been able to determine if they have changed their modex to fit their new callsign.

Modex	Aircraft Type #	Serial or BuNo
RF 013	TH-57C	162013
RF 016	TH-57C	162016
RF 171	H-60	161171
RF 172	H-60	161172
RF 173	H-60	161173
RF 176	SH-60B	164176
RF 200		
RF 283	YSH-60F	163283
RF 337	NSH-60B	162337
RF 399	H-53	152339
RF 506	UH-3A	156506
RF 541	CH-53E	
RF 549	AH-1Z	162549
RF 614	NVH-3A	150614
RF 728	SH-3H	149728
RF 742	MH-60S	165742
RF 743		
RF 744	MH-60S	165744
RF 768	UH-1N	158768
RF 804	SH-60F	164804
RF 836	UH-1N	160836
RF 937	AH-1W	163937
RF 976	SH-60B	162976



VX-1 P-3C

VX-1

The mission of the VX-1 "Pioneers" is to conduct tests, evaluations, and investigations of antisubmarine warfare aircraft systems, weapons systems, airborne strategic weapons system, support systems, equipment, and materials in an operational environment. Because of the squadron's unique position as an interfacing unit between the development of new weapon systems and their subsequent introduction into the fleet, VX-1 is considered

the squadron that "does it first."

Operational aircraft are assigned to carry out the flight operations necessary to support project evaluations. These include the P-3C Orion, S-3B and ES-3A Viking, SH-60B/F and HH60H Seahawk aircraft. Additionally, VX-1 provides test and evaluation support for such diverse programs as the MH-53, SH-2G, CH-60, S-3 Seadragon, SP-26 Seaspirit, V-22 Osprey, E-6A Hermes, Global Positioning System, and Ground Proximity Warning System.

As antisubmarine warfare operations change to meet the threat posed to our national security by hostile submarines, so, too, does the nature of projects assigned for evaluation. The squadron currently has approximately 80 projects assigned involving complete weapons system evaluations and investigations of electronic, acoustical, and optical methods of submarine detection, classification, and localization.

The squadron has approximately 50 U.S. Naval Officers, two British and one Canadian exchange Officers, 263 enlisted personnel, and six civilian personnel onboard. The squadron maintains a mixture of officers with recent fleet experience and those with postgraduate education in such fields as computers, underwater acoustics, and aerospace engineering. Squadron enlisted personnel who maintain the aircraft have talents and skill representative of those found in operational fleet squadrons.

Since 1946, the squadron has undergone three name changes and one relocation. In

October 1949, the name changed to Development Squadron One, and in February 1950 to Air Development Squadron One. On January 1, 1969, the present title of Air Test and Evaluation Squadron One was adopted. The long association with NAS Key West ended on 15 September 1973 when the squadron changed homeports to its present location at NAS Patuxent River, Maryland.

Today the VX-1 Pioneers continue their support to maritime operations with operational testing and evaluation on the Navy's newest aircraft, the MH-60S, MH-60R, as well as continued evaluations on legacy aircraft like the, KC-130J, E-6, EP-3, P-3C, S-3B, SH-60B, and SH-60F. Gone are the days of sole ASW improvements; VX-1 is now also pushing the forefront of technology in the arena of tactical developments in SUW (surface warfare), AMCM (airborne mine countermeasure), logistic support, extended range surface/land attack, and electronic warfare.

When working with Pax River entities, VX-1 aircraft use the callsign Pioneer. When working with other ATC entities or traveling away from the "Pax" area (which they frequently do), they use the callsign Navy Juliet Alfa ##. Helicopters working in the upgrade programs use the callsigns Yankee (UH-1Y) or Zulu (AH-1Z). The following are the VX-1 aircraft I have identified:

Callsign	Aircraft Type	#	Serial or BuNo
JA 01	P-3C		161585
JA 02	P-3C		
JA 03	P-3C	158206	SMIL/NON ASW

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JA 04	P-3C	159889
JA 05	P-3C	160291
JA 06	P-3C	163006
JA 07	P-3C	161122
JA 09	P-3C	
JA 175		
JA 24	H-3	152116
JA 31	H-2	149750
JA 38	SH-60B	163238
JA 39	SH-60B	164462
JA 41	H-60	161561
JA 42	SH-60B	162349
JA 43	SH-60F	163282
JA 44	SH-60F	164070
JA 46	SH-60F	164443
JA 47	SH-60B	164612
JA 60	MH-60S	165746
JA 61 PIONEER 61	CH-60S	165747
JA 62 PIONEER 62	CH-60S	165752
JA 70		
JA 714	S-3B	160153
JA 715	S-3B	160149
JA 717	S-3B	160592
YANKEE 1	UH-1Y	166475
YANKEE 2	UH-1Y	166476

ZULU 1	AH-1Z	166477
ZULU 2	AH-1Z	166478
ZULU 3	AH-1Z	166479

VSX-1

This is a newly established unit. It used to be the air component of the Naval Research Laboratory (NRL) contingent at NAS Pax River. VSX-1 flies several specially-configured NP-3Ds, bureau numbers (BuNos) 149674; 158227; 153442; 154587; 154589; and 160764. These aircraft normally use the voice callsign Researcher plus the last three digits of their BuNo.

NP-3D BuNo 153443 used to belong to this unit, but about two years ago it was transferred to the Test Pilot School and now flies as Tester 443.

Air Operations Detachment

The AOD operates several UC-12s (BuNo 161501, 161185 and 161190) for

transport and liaison duties. They also use their modex Navy 7A ### as callsigns.

Frequencies

This concludes the rundown of the flying units at Pax River. The loggings below include some of the frequencies (MHz) in use at Pax. These are derived from my own monitoring and one other local listener.

If there is interest or when space permits, we'll elaborate in *MT* or on its website about which activities you will hear in the various restricted areas and on the airspace management system known as "Baywatch," which controls 35,000 square acres of airspace. Needless to say, the myriad of test programs at such a large installation make for a wide variety of communications. If you're in the area, tune in to the ever-changing action of naval test flights.

Resources:

The following web sites were researched in the preparation of this article:

<http://www.nawcad.navy.mil/testwinglant/platforms.cfm>
<http://www.usntps.navy.mil/about.htm>
<http://www.usntps.navy.mil/part4.htm>
<http://force.navair.navy.mil/History%20pg1.htm>
<http://www.nawcad.navy.mil/testwinglant/force.cfm>
<http://arf.navair.navy.mil/atr.cfm>
http://www.nawcad.navy.mil/product_sub-area.cfm
<http://www.ncts.navy.mil/homepages/vx-1/>
<http://www.nawcad.navy.mil/testwinglant/rotarywing.cfm>
<http://www.usntps.navy.mil/about.htm>
<http://arf.navair.navy.mil/atr.cfm>
<http://www.globalsecurity.org/military/facility/moa-pax.htm>

Test/Project

119.275	Advisory Check-In	Btn-8or9	Simo W/354.8 & 270.8 & 369.9
	Baywatch		
122.200	Flight Service	Btn-20	Simo W/255.4
124.700	Potomac App	Btn-19	Simo W/338.2
126.200	Webster OLF Twr		
233.750	Test		
235.725	Test		
236.300	NRWATS/HX-21	Base	Black Jack
249.650	V22 Osprey	Base	Osprey Ops
249.950	Test		
250.700	NSATS/VX-21	Base	Salty Dog
250.850	Advisory	Btn-18	Alert/Helo Advisory
	Baywatch		
251.450	Test		
255.400	FSS	Btn-20	Simo W/122.2
256.500	Advisory	Discrete	Baywatch
262.950	Echo Ctrl	Advisory	Echo/Data/Shadetree
	Monitored		
264.150	USN TPS	Base	Tester
264.550	Echo Ctrl	Advisory	Echo/Data/Shadetree
	Monitored		
268.650	Test		
274.200	NRWATS/Hx-21	Projects Freq	Black Jack
277.000	Test		
285.200	NFATS/VX-20	Ops	Waterbug
289.800	Test		
291.150	Echo Ctrl	Echo/Data	
291.300	Echo Ctrl	Echo	
299.400	Test	Advisory Monitored	
302.250	H-1 Upgrades	Base	
302.550	Base Ops		
310.550	Echo Ctrl	Advisory	Echo
	Monitored		
321.800	Echo Ctrl		Echo
325.000	Test		
337.900	NRL FSD	Base	Researcher
338.200	Wash App	Btn-19	Simo W/124.7
341.100	VX-1	Base	Pioneer
342.700	Test		
350.900	Test		
353.300	NRWATS/HX-21	Lab Test	Black Jack
354.800	Advisory Low	Btn-8h	Simo W/119.275
	Baywatch		
358.000	Webster OLF Twr		
360.400	Test		
363.350	Test		
369.900	Advisory Check-In	Btn-17	Simo W/119.275
	Baywatch		
376.800	Test		
381.700	Echo Ctrl	Echo	
382.950	Test		
387.900	FCLP	Paddles	
392.675	Test		

Patuxent River Flight Test Center Logs

VHF Air Traffic Control

117.600	Leesburg Radio		
120.050	Approach/Departure (App/Dep)	Button-7 (Btn)	
120.600	Ground	Btn-3	Simo W/336.4
121.000		Btn-7	Simo W/250.3
122.100	Leesburg Radio		
123.700	Tower	Btn-4	Simo W/344.4
127.950	App/Dep	Btn-6	Simo W.314.0
133.900	Washington Center (ZDC)		
134.100	Radar	Btn-10	Simo W/362.6
135.025	Ground Controlled Approach (GCA)		
135.200	Clearance Delivery	Btn-5	Simo W/384.4

Uhf Air Traffic Control

243.000	Guard		
250.300	App/Dep	Btn-7	
270.800	Advisory High	Btn-9	Simo W/119.275
	Baywatch		
276.200	ATIS	Btn-2	
281.400	ZDC		
281.900	App/Dep	Btn-7	
286.000	Radar		
301.200	GCA		
305.200	GCA		
314.000	App/Dep	Btn-6	
318.800	GCA	Btn-11	
336.400	Gnd	Btn-3	
340.200	Twr	Alt	
344.400	Twr	Btn-4	
348.000	GCA	Btn-12	

Shortwave Log - SWLog

Marrying Radio Monitoring to the Internet

By John F. Catalano

What if a program existed that enabled the shortwave community to share station intercept data almost instantaneously via the Internet? You could see and take advantage of propagation conditions on the spot. But, assume for a moment that the program also allowed you to tune your receiver to someone else's intercept with a single click of the mouse!

Is this just all fantasy? Hams have had "frequency clusters" on the Internet for a few years where propagation and "hot" DX frequencies are shared. So what about radio monitors?!

Now, with a program called SWLog, shortwave monitors can join in the excitement of instantly sharing "hot" frequencies with their counterparts around the world. But the program does very much more than this. So let's dig in and see what this SWLog is all about.

SWLog Distilled

Simply stated, SWLog is a database and receiver control program. So what's new about it?

Plenty. SWLog can obtain station/frequency data in a number of ways. The user can manually input data into the program. Nothing new here. But SWLog can get data, lots of it, by connecting to *nine* different shortwave frequency/station databases via the Internet. It then

collects *all* this data and presents it to the user for controlling his or her receiver. Talk about being well versed! And finally, SWLog can "read the mail." In this mode, a "community" of shortwave monitors have banded together. Using the Upload feature of SWLog, they make their loggings instantly available to the monitoring community via the SWLog server. Now that *is* new!

Logging on to SWLog

The full, unlocked version of SWLog (build 1968) can be downloaded for **free** from <http://www.shortwavelog.com>. If you are using dial-up (as I am) get a good book and be prepared for a long wait. The zip file weights in at a hefty 15 MB – nothing to you people with high-speed cable or DSL, but a bunch of time for us dial-up folks ... But it's well worth it.

Unzipping the download file results in three programs. A text file highlights the features of SWLog, while an Acrobat "pdf" file gives installation details (much more on this later). Finally there is the program file itself. Now we're ready for installation.

Not So Quick!

Well, I thought we were ready for installation, but that was a few days ago. The SWLog Install document is very carefully written and

clearly shows the need to download up to three files from the Microsoft website. Some of these may already exist on your system. If not, be prepared for lots more download time. The Microsoft programs needed are .NET Framework version 1.1, MDAC version 2.6 or newer and the JET database service pack 6 or newer.

Depending on which version of Windows you are running, you could be looking at 30 MB of downloading. Having the latest Windows Service Pack CD will make life much easier. Believe me,

your effort will be rewarded, so keep reading.

Until the proper Microsoft environment exists, SWLog will not load. So, after all the downloading and installation of the Microsoft programs it was thrilling to see SWLog load completely and run.

What Hardware is Needed?

Initially I loaded the program on my Pentium III 1 GHz, 256MB RAM PC running XP and it ran great. In order to see how hardware intensive it is, I then ran it on an old Pentium I 233 MHz 256MB RAM PC running Windows 98SE. Again it worked perfectly, though a bit slower, which was noticeable in screen updates. The big difference was in database access times. Times required to import database files were up to ten times slower on the old PC.

The Pentium I system I used could only give a maximum of 800x600 screen resolution, in 16 bit color. Therefore, not all of the screens were completely viewable without using the vertical and horizontal screen "sliders." The XP machine was set for 1024 x 768, which allowed for most (but not all) displays to be seen as full screens without "sliding." However, this resulted in smaller character size. Get out the reading glasses. We'll use the faster PC for this overview.

Where R U

To start, we must tell SWLog our monitoring location. This is done via the "Options" command at the top right of the screen. Then we choose Systems Settings and enter our location's longitude and latitude among other details. An excellent interactive Help file is part of the SWLog program, thank goodness. The program allows the user to enter a number of locations if you do your monitoring from different places or while on a trip.

Receiver Control

SWLog will control just about any serially enabled receiver. I used it with an ICOM R75, Ten-Tec R320 and ICOM PCR-1000.

The "Utilities" menu is where the radio control details are set. Start by selecting "Radio Control." Figure 1 shows the basic Select Receiver screen with the ICOM R75 chosen. The

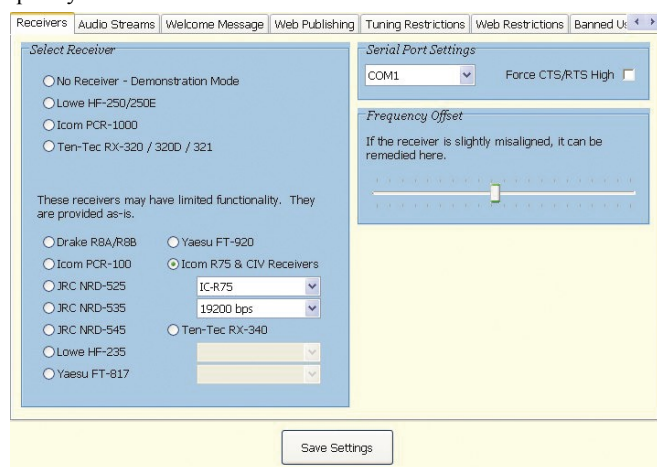


Figure 1 – Shortwave Log's (SWLog) select receiver screen with an ICOM R75 as the "Chosen One."



Figure 2 – Receiver control screen for ICOM R75. Note the radio polling box lower left.

first three receivers listed in Figure 1, Lowe HF-250/250E, ICOM PCR-1000 and Ten-Tec RX-320/320D/321, have all of their features fully operational. Although not on this list, I found the R75 had most of its regularly used features fully functional under SWLog control.

Once the receiver is selected, we can control it by clicking on “Remote Radio Control Client” (RRCC) also under the “Utilities” command line menu. Figure 2 is the well-organized, easy to use receiver control screen for the ICOM R75. Its operation is very intuitive and requires no instructions. Make sure you check the “Poll Radio” box, so that manually tuning the receiver will be reflected on the computer display. I particularly enjoy this feature. SWLog has one of the smoothest operating radio interfaces that I have used.

Once installed, the RRCC allows control of your receiver over a home network, Internet or via webpage. But that’s not all this program can do. Let’s try out each of the three modes of operation.

Fingers do the Walking

Laborious manual entry is made easier with a “fill-in the blanks” and drop down menu approach as seen in Figure 3. The User’s database

is selected via the “Logbook” command at the top left of the screen. The new logging entry form is very comprehensive and even allows the user to attach a sound clip of the logging at the bottom of the page. The program automatically fills time and date, displays a map of the country of transmission origin and its flag. The Logbook command allows the user to browse and edit existing log files and play audio clips.

Database Heaven

Using the database mode is a multi-step process. Here the Help file’s “New User Quick Start” is really indispensable. First we have to choose one or more databases to download. Begin by going to the “Options” command. Select “Import” and then select a database, for example, Prime Time Shortwave English Language Schedules. See Figure 4.

Clicking on the website for this database, located on the bottom left of Figure 4, directs our Internet browser to the download site. The database file is downloaded and stored on our PC.

However, in some cases the file must be converted to a format compatible to SWLog. Clicking on the “Import Schedule” located on the lower right of Figure 4 does the job. Now the Prime Time Shortwave database is ready for use. But why stop there?!

When this process is repeated for all accessible databases, SWLog users have a tremendous resource at their fingertips. This amount of timely SWL data was unthinkable just a few years ago. Now, you can have it all on your PC and use the data to easily tune your receiver. Database updates occur on a regular basis and should be downloaded to keep your database current.

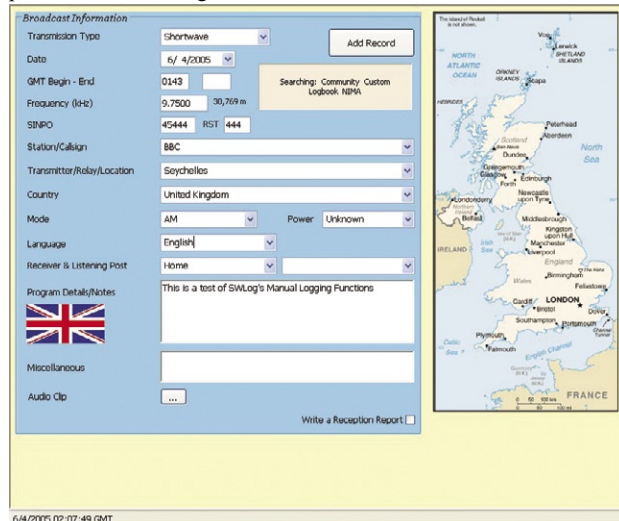


Figure 3 - SWLog's manual logging entry screen

Staying REALLY Current

The third method by which SWLog can obtain frequency data is the most unique and up to date ... in fact it can be up to the minute. The “Community” menu on the command line holds the key to this pretty exciting method of finding up-to-the-minute active frequencies. As the program puts it, “The Shortwave Log Community provides a database of shortwave broadcasts, ... with the twist that the database shows actually logged stations and is updated in real time.” See Figure 5.

The real-time logging from users can then be loaded into a community database and used in the same manner as the website databases above. Now that’s really current data.

SWLog provides all of its users the ability to join in the community by uploading their logs for the mutual benefit of all members of the community. Then everyone collectively benefits.

O.K, Now What?

Regardless of the source, once the databases are imported into SWLog, they can be scanned, displayed, and used to control your receiver. Then you can selectively save stations of interest in your User database. The databases can be manipulated in a number of useful ways. Space does not permit us to cover them all in detail. Here’s a quick overview.

What's Playing Now



Figure 4 – Prime time shortwave database download and import screen

Under the “Database” menu on the command line, four main ways of accessing the databases are displayed. “What’s Playing Now in ...?” first asks the user to select a language. Then it searches all the databases that you have downloaded and imported for matches to the current time local time based on the location of your station. Remember, if you include the Community database you will see scheduled stations and stations that have actually been logged. Figure 6 results.

Look at Figure 6. The top of the screen is a map of the world with dots indicating the location of stations currently, or scheduled to be on the air at this time in English. Right clicking on a dot brings up the information about that station.

We did this for Ascension Island in the Atlantic. The resulting box shows lots of info including frequencies, call sign, origin, power output, directional beam, language and source of info, on BBC and WYFR currently scheduled for transmission at this time. A sun terminator line is also displayed.

The bottom half of Figure 6 displays the detailed results of the search, which has yielded 405 possible broadcasts. Figure 6 displays just a

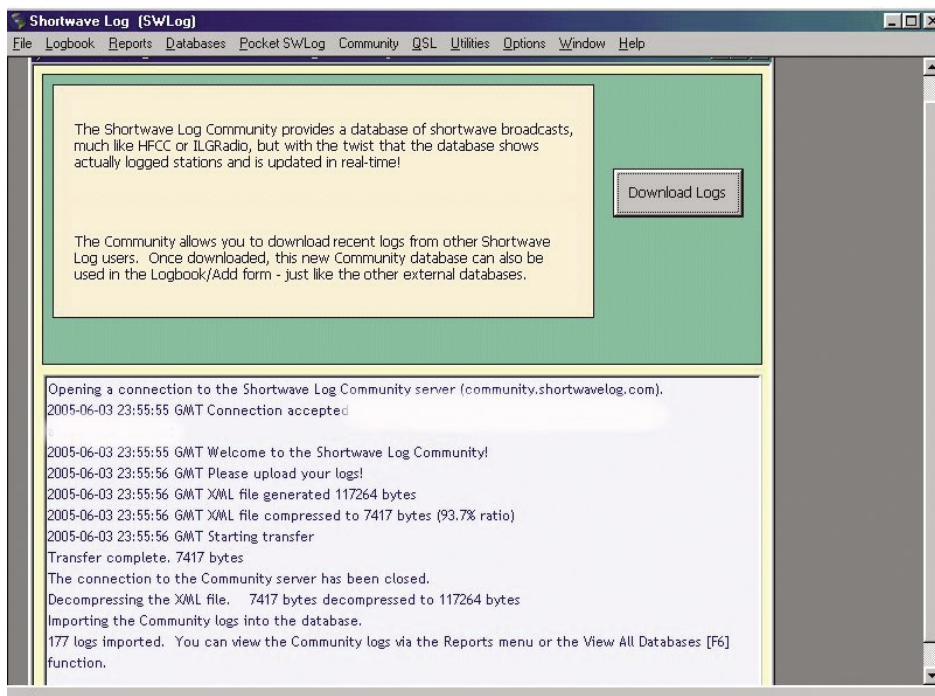


Figure 5 – Linking up with the SWL “community”

small number of columns and rows of the search. You’ll have to use the screen “sliders” to display all details. A single click on a line will tune your receiver to that frequency. Double clicking the line adds it to your User logbook. Things cannot get simpler or easier than that.

“What’s Playing Now” (WPN) searches for all stations currently on the air regardless of the language.

More Database Methods

In the “View All Databases” method, a list of possible database sources is displayed along the top of the screen. The user then picks which databases are to be included in the search. This combined database can then be searched by

frequency, country or station. In addition, each of these can be searched by WPN (What’s Playing Now). Detailed screens give the user station information.

The “Search Databases” method lets the user pick one database to search by field, i.e. frequency or language. A very useful feature lets the SWLog user search for a string of words in the database.

For all database search methods a single click on a line will tune your receiver to that frequency. A double click adds the line to your user logbook. All the database modes worked smoothly and quickly on the 1GHz Pentium III running XP.

With each double click of a database line

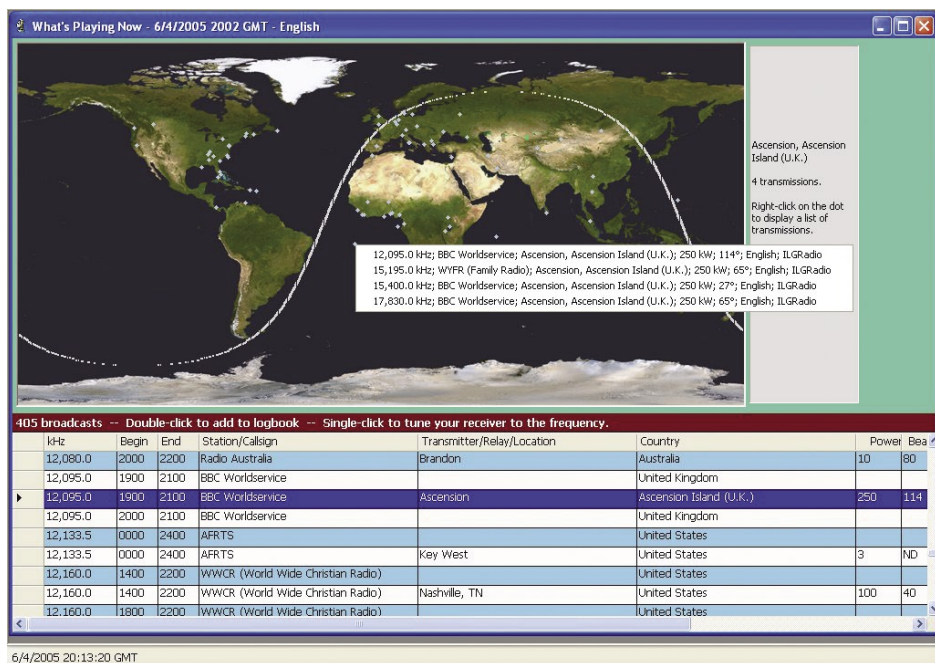


Figure 6 – The WPN screen displaying what’s playing now in English graphically, by database entry and lots more info

you are building your own user database. Add to these your own frequency “discoveries” and you have an up-to-date, comprehensive, customized shortwave database. Now don’t forget to share it!

Never Satisfied

When downloading databases, there are two things that can cause some users to falter. SWLog directs you to each database website. But once on the site, finding the correct SWLog import-compatible database may take some searching and careful reading. For example, the ILGRadio site has lots of database formats. However, only the dBase IV without DOS graphics is compatible with SWLog. A link directly to the correct format would be very helpful. Of course, the problem may be that these links change with the updates.

Now, once the database file is downloaded, the file must be in the proper PC file format so SWLog can read it. For example, some database files are downloaded in a “.zip” format. But SWLog can only import/convert certain databases from a “.txt” format. Downloads from these sites require manual unzipping before they can be imported into the program. However, for other database sites for whatever reason, SWLog can import “.zip” files. This makes downloading from each database site a unique experience.

SWLog has done a great job of taking all these different database formats and making them readable and compatible. However, a more consistent approach to handling downloaded files would make life easier for the SWLog user.

“Slider, You Stink!” That’s a line from the movie *Top Gun*, but it’s also appropriate here. The screen displays are a bit unruly, sometimes not allowing access to the “slider” controls without mouse gyrations. Since there is so much data to display, there is no easy answer. Anyone who has done a complex business plan or budget using an Excel spreadsheet knows the problem. Perhaps going to mini multi-screen displays and allowing the user to expand the area of interest is a way forward.

It’s a Keeper

SWLog does a lot more that we have not covered. It allows the user to control on-line receivers located around the world (the current number is nine). The report generation capability of SWLog is phenomenal, and it alone could take several columns to explore. QSL creation and management is also included. Propagation forecasts, mapping, call sign lookup and sunrise/sunset data are just a few of the valuable features of SWLog. A Pocket PC version of the program is available on the website but was not tested.

If you are prepared to download additional files and read a few paragraphs of the on-line user’s manual you will be greatly rewarded. SWLog combines many key elements of radio monitoring and the Internet in a simple to use and uniquely useful package. Keep in mind that SWLog is provided free of charge! Thank you, SWLog team! For medium and shortwave monitoring in 2005, SWLog is in my list of top ten monitoring programs.

New DX Season: Four Ways to Make it Great

This month the autumnal equinox comes to the northern hemisphere and we can begin to enjoy more favorable HF band conditions, less atmospheric static, and cooler weather. Here are four ideas which might help you get a head start on the season.

❖ AM DXing

September is a pivotal month in AM band DXing. The shorter daylight hours bring the DX rolling in a little earlier and it coincides with the "stretch run" in the baseball season. Baseball and AM DX grew up together in the first 50 years of the last century and the games provide a great way to identify stations. But, if your reception isn't the greatest it may not be your radio. Try these three ideas to boost AM reception at your listening post.

Loopy Reception

Most radios, especially portables, have built-in ferrite loop antennas for AM reception. While these are fine for normal AM reception, DX needs a little help. The easiest, cheapest, and least space consuming AM antenna is the tuned loop. The Terk AM Advantage (see photo) is just such a loop. Based on an 85 year old idea, this passive antenna is a fairly large coil of wire which is tuned (made to resonate) on the frequency to which your radio is tuned.



The Terk AM Advantage is a passive loop antenna designed specifically for the AM band and improves reception on even the cheapest portable radio. (Courtesy: Crutchfield.com)

By rotating the antenna 90 or 180 degrees, you may also tune out stations operating on or very close to the station you're trying to hear. It's a simple, effective, and very cheap way to increase the reception capabilities of any radio.

There are several versions of this antenna on the market at a variety of prices, so it pays to check around. It's even possible to make your own using a variety of plans widely available on the web. Try this site:

<http://www.mtmscientific.com/loop.html>

for ready made loops or loop kits. Check out these beautiful home made loop antennas:

<http://www.schmarder.com/radios/misc-stuff/loops.htm>

Strung Out Reception

If you're seriously interested in tuning an AM station from a specific direction and have a little room to play with, try a "mini" Beverage. The Beverage antenna, another 85 year old idea, can be a better performer, as it helps reduce atmospheric noise and can be highly directional. A real Beverage antenna should be one or more full wave lengths long. But in the 300-400 meter wavelength band, who's got the room? It's still possible, however, to take advantage of the distinct Beverage properties with a shortened or "mini" version. For details on general Beverage construction see Clem Small's *Antenna Topics* in this past July *MT*. I've had great success with one as short as 300 feet and even better success with one 750 feet long.

You can have two mini-Beverages at right angles to each other (separated by 10 feet or so) and with the two leads coming into your listening post attached to an antenna switch, you can flip between the two antennas to get all four compass points. Remember that they're relatively low to the ground (I put them just above head height), so look around for possible ways to run them, such as alongside a long hedge or through a nearby woods. It may be possible to solicit the permission of a neighbor to extend your range.

I buy all my antenna wire from Tractor Supply where it's sold cheaply as electric fence wire in rolls 1/4 mile long. They've also got all your antenna insulator needs too!

Cut Out That Racket

The broadcast band is a cacophony of atmospheric noise, adjacent channel interference, ambient electrical noise, and general over-



Get your antenna supplies at Tractor Supply! Yes, TSC is not just for cowboys and ranch hands, this store has more antenna supplies at cheaper prices than Radio Shack! Here's 1/4 mile of 17 gauge antenna wire and two types of post mounted insulators. (Courtesy: Tractor Supply)



crowding. And, if your main DX radio is an older desk-top model (like mine) or is an older portable (like my other one) without all the built-in DSP filters, you may not need a new radio; you may just need an outboard DSP filter such as the MFJ-784B. This is the ultimate outboard filter, capable of improving reception on nearly any receiver. The 784B takes the audio output of your receiver (your speaker jack), filters the audio, and plays it through the external speaker of your choice. While it can't do anything to improve the initial received signal (that's up to your antenna and your radio), the resulting audio output is phenomenal.

SWLers will appreciate what this filter can do on the HF bands, and hams will find that the PTT (push-to-talk) sense line allows them to keep this filter in line even when transmitting. Don't be alarmed at the impressive array of switches and knobs on this filter; it's extremely easy to operate and worth every dollar of its up-scale \$250 price tag.

❖ Shortwave DXing

The HF bands this time of year are really starting to heat up. Not only that, but we are slowly but surely climbing out of the bottom of our current solar cycle doldrums. While the bands may not be as great as they will be in a few years, you can dramatically improve your SW reception by building a tunerless, all-band HF antenna. Throughout the years I've described this particular antenna in this column and many *MT* readers have confirmed its astounding capabilities.

It's based on the popular, long-used Win-



Tune in, turn on your DSP and drop out all the interference you used to get on your radio with MFJ's 784B tunable, programmable DSP filter. Use it on portable or desk-top receivers. (Courtesy: MFJ Enterprises)

dom and G5RV designs, but was perfected by MT's own Bob Grove to work particularly well on the 80 through 10 meter ham bands. What Bob has done is make this antenna perform without the need of an out-board antenna tuner with an SWR of 2:1 or better. That also makes this antenna a terrific SWL antenna.

Briefly, here are the virtues of this antenna. It's relatively short (134-ft long), very low noise, easy to build and inexpensive. A complete description of this antenna is found in the October '00 *MT Beginner's Corner*. You can find the plans for this if you have saved your back issue of *MT* or have the MT CDRM archives. It's also online at <http://www.monitoringtimes.com/html/mtswlprimer3.html>. If you have neither the magazine nor the internet, you may receive a reprint through the mail by sending a check for \$3 with your reprint request to the address in the front of this magazine.

At my own location I have this antenna only 25 feet in the air and have been able to re-

ceive stations from all over the world. And, for hams, it's a great transmitting antenna. While it receives well on the AM and 160 meter bands, it does not transmit on 160 and it's not as quiet on AM as a Beverage.

❖ Field Day Remembered

As this is written, the annual ARRL Field Day is still fresh in the log book and I'll give a brief description of how it went at my location, because it's instructive regarding the nature of emergency preparedness and radio.

Most of this year I've been involved with digital ham communications, so I imagined that I would make this my first all-digital Field Day. The Saturday morning of the event (it's always the last full weekend in June) I had two tasks: Build and put up a good antenna for all HF bands; assemble the station (transceiver, computer, and battery); and get it all on the air by starting time.

I picked out two big oak trees on the property, paced the distance between them (120 feet) and made a simple dipole fed with some 50 feet of extra 450 ohm ladder line I had stuffed in a closet. Next I set up a table; hooked the ladder line up to a tuner/antenna switch/dummy load; hooked that up to the transceiver; pulled the battery out of my '85 Celica and tuned around the bands. Signals were coming in nicely.

The ham I had planned to do Field Day with was a last-minute no-show and, since it

was his laptop I was planning to use for the digital work and I don't have one, I was sunk. Determined to still try, I called around to my neighbors for an extra lap-top I could borrow and found one immediately. I loaded it with the necessary digital mode software, hooked it to the transceiver and discovered what everyone else who's ever used a lap-top already knows – in the daylight it is very hard to see the screen. The keyboard was much smaller than I was used to, resulting in a 50% keyboard error rate; and the dinky finger mouse pad gave me a learning curve much longer than all of Field Day.

It was already 3 hours into the 24 hour event and I had yet to make a contact, so I abandoned the digital concept, strapped on my home-brew headset mic and set out to salvage the rest of the daylight. As it turns out, the make-shift antenna worked beautifully on all bands 80-10 and, though running just 50 watts, had quite a few compliments on signal strength and audio quality. Here's the breakdown: I spent a total of 4.75 hours on the air making 86 total contacts; worked 41 states, two territories, three provinces and one DX (Mexico). The highlight was working a 9 year old kid!

The point to the whole exercise is that you have to be prepared to operate with what you've got. If plan "A" isn't working, you had better have a plan "B!" I suppose if my microphone hadn't worked right, I'd be forced to dust off the old key and (gasp!) do Field Day in Morse code.

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Q. My two scanners, a BC 250D and a BC 246T, are suffering from very poor reception after I hooked them to a mobile antenna mounted 6 to 7 inches away from another transmitting antenna. Now, no matter what mobile or handheld antenna I put on either of these scanners, the reception is poor. Do you think I have damaged the scanner with the other antennas? (Kenny Ball, Roanoke, VA)

A. Although modern scanners are designed with overload protection, it's always possible that you have burned out the RF preamplifier transistor in each of them from being too close to that transmitting antenna. Much depends on how much power was being transmitted at the time.

You might also want to take a look inside the BNC antenna connectors to be sure the little center conductor leaves haven't been splayed apart and are no longer touching the center pin of the BNC male plug.

Check, too, to make sure you don't have the attenuator function turned on.

I assume you have tried other scanners side-by-side on the same antennas to make your diagnosis.

Q. I would like to try using a 10-element, 144-148 MHz amateur beam for 155 MHz reception. Is its bandwidth wide enough for good performance that far away in frequency?

A. A high-gain beam has a very narrow effective bandwidth, perhaps 5%; at 144 MHz, that would be 7 MHz; that's pretty far away from 155 MHz. Even if you cut one for 155 MHz, you would be limited in reception over the entire high band (151-174 MHz).

This doesn't mean that it wouldn't hear anything, but it does mean that you would notice a difference between antennas cut for the two frequency bands. Since the elements on the 2-meter beam are a little long, you could actually cut them a little shorter and probably notice some improvement.

One way you could tell for sure whether

or not the 2-meter beam is working or not at the higher frequencies is to rotate it while listening. If signals at 155 MHz show the same sharp directivity as they do at 144 MHz, then you don't need to do a thing. If they are broader, then cutting them back about 6% of their individual lengths should help.

You can, of course, settle for a wide-band, log-periodic dipole array like the Grove "Scanner Beam" and be done with it. It's not as strong, but it's in thousands of scanner monitoring installations, and you don't have to cut a thing for 2 meters or 155 MHz!

Q. Years ago, Radio Shack made a small, indoor, amplified TV antenna that was a small black box about the size of a pack of playing cards with two telescoping antennas attached to one end. Since it's no longer available, why hasn't someone else come out with a similar antenna? (Steve Palmer, email)

A. I think there are several reasons why you don't see amplified, indoor, preamplified TV antennas any anymore:

- (1) With the emergence of so many RF-generating consumer appliances, amplified indoor antennas are likely to produce more interference than years ago;
- (2) Transmitters are everywhere now, so even outdoor preamplified antennas are likely to suffer from strong-signal overload resulting in poor reception;
- (3) Satellite TV and cable are usually the answer for people who used to be too far from TV stations to get good reception;
- (4) Consumers now are of a plug-and-play mentality, no longer interesting in fiddling with accessories to make their reception better.
- (5) If cable, satellite and VHF/UHF TV are not available, consumers have Internet, email, chat rooms, on-line video, DVD's and even multi-screen theaters for alternative entertainment.

Q. What different bands are used by the different cell phone

systems, and why are there different systems? Are some better than others, thus accounting for lack of external antennas on modern cell phones? (Ronald Blocker, K9JON, Glenwood, IL)

A. The antennas are still there, housed in the phone's signal-transparent cover. Historically in the U.S., all cell-phone systems, analog and digital, used the same part of the spectrum, 824-849 MHz (phone transmit) and 869-894 MHz (tower transmit).

More recently, the 1900 MHz portion of the spectrum has been added to accommodate emerging technologies. European cell-phone bands are slightly shifted in this part of the spectrum. "Quad-band phones," cellular telephones with all bands, are often recommended for world travelers.

Two dominant digital systems have been used in the U.S.: time division multiple access (TDMA) and code division multiple access (CDMA), but the European GSM system is finding acceptance here as well.

There aren't any profound technical advantages of any one system over another; it's largely how the signals are processed and distributed as a convenience to the user.

Q. Can I mount a CB whip on my house and use it as a CB base antenna? (James Ashe)

A. Yes, but you will need to substitute some metal for that missing car body, otherwise you will only have half an antenna. If you have a mobile home, it's no problem; just mount the antenna on the roof and attach the screws of the mount physically to the metal of the roof. Otherwise you will need at least two and preferably three metal radials (wire is fine) connected to the mount and running out along the roof like spokes on a wheel.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.) The current Ask Bob is now online at our website:
<http://www.monitoringtimes.com>

Getting Started

Bright Ideas

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It's time for my bi-yearly reminder for preventive maintenance (PM) on all your radios. With more than 20 hand held ham transceivers, scanners, and a dozen mobile rigs, this is an all day project for me.

To **clean exterior surfaces**, I use a soft cloth, slightly moistened, for basic cleaning. Do not use household cleaners. I then use a *soft, clean* toothbrush for gently reaching into crevices, around keypads, microphones, and recessed corners. Stubborn scum might require a drop or two of rubbing alcohol to loosen the dirt. I also use a cotton swab where appropriate. Finally, I use a soft, dry cloth to finish up. Scratches on the display lens can be lessened with toothpaste, Brasso, or similar products.

Don't overlook the all-important **coax connection**. Remove the antenna or coax connector. Use a cotton swab lightly dipped in rubbing alcohol to reach into the female connection. I pull the cotton outwards to form a tip. If it is a BNC, look at the small inner hole which usually has two or four metal sides. Sometimes you need to take a pin and gently push the metal towards the *middle* to insure a good connection with the male pin on the antenna or coax. This is delicate work; leave it to an expert if you have any doubts about your skill level.

Again, using a cotton swab, clean around the male pin on the antenna. Is it loose or missing? It's probably time for a new one, as your listening experience is never any better than your antenna. How about your aging coax or external antenna? At the very least, they need to be visibly inspected.

I do not recommend opening up the radio. Many have small rubber gaskets for water protection and getting them back in place can be a nightmare.



Do it today!

Using an appropriate size screwdriver, you should **snug up all the tiny screws** everywhere around the radio – that's *snug*, not overtighten, including screws inside the battery compartment. This insures that you keep the radio relatively dustproof and water resistant. Constantly carried handhelds and mobile installations are especially likely to have screws that begin to back out during normal use. Rough treatment or bumpy backwoods roads call for more frequent maintenance. I should know; these conditions apply to me. I live on a mountain top, and the last six miles are a dirt road full of pot holes.

I have two deep cycle marine **batteries**. Both require a check on their water level. I was surprised to find that they both were low. You need to be careful here. The best solution is "Sterile" water. I had to get a physician's prescription (at least here in WA state) for a liter bottle of sterile water. Medical supply houses, hospital pharmacies, or some regular pharmacies should carry it. Distilled water is also fine but is sometimes hard to find. Tap water is a last resort. Regular bottled water is NOT acceptable. Reading the label, you'll notice most bottled drinking water contains a phrase like "enhanced with minerals." Well, these minerals are exactly what you do NOT want in your battery. I then used my special conditioning trickle charger to bring them up to full capacity.

Check all hand held radios for batteries. Some of my old scanners are rarely used. I remove the batteries lest they corrode. All alkaline batteries *will absolutely* eventually leak. I clean the battery terminals and recharge the battery.

54

WildFire is the official publication of the International Association of Wildland Fire. Their website is <http://wildfiremag.com/>. I subscribed for six issues at a cost of \$30. Save your money; the magazine is a slim 36 pages, with more than half the magazine devoted to advertising.

In fairness, I must state that it is a professional journal and not meant for the casual hobby market. It does have some very nice color photos and short articles. It reminds me of what *Wildland Firefighter* magazine looked like five years ago. But *Wildland Firefighter* has made progress, and I now rate it a good magazine for those of us really into monitoring wildland fires. Their

URL is <http://www.wildlandfirefighter.com> and the price is \$29.90 for 12 issues. I just wish they would list more frequencies and articles on radio communications.

55

There is an on-going debate about what batteries work best: Lithium-ion, Ni-MH packs, alkaline, or rechargeable individual batteries. Ni-Cads are pretty much outdated technology. I had tried to standardize my battery usage to use the new quick 15 minute rechargers. I keep a supply of batteries in a small plastic container. I carry an identical charger in my Go-Bag which is always in my car or with me. I made a fused DC cord with Anderson connectors for the charger to supplement the AC charger. I recommend you make up a DC cord for your charger no matter what type or brand.

56

I have an update on my recent new scanner purchases – the Pro 2051 mobile/desk model and the hand held Pro 83. First, I find their sensitivity great, even with the stock supplied antennas. However, their selectivity is a little loose, bringing up adjacent frequencies. Their scanning rate is super fast, at least 100 channels per second.

Both have the instant Skywarn feature, but how do you know what this hidden frequency is? If you are a ham, you probably know or can inquire at the ARES/RACES weekly radio net. Anyone else could call their local NOAA Weather office. Specifically, ask for information on the Skywarn ham group. As for programming the NOAA weather FIP codes, go to this website: <http://www.crh.noaa.gov/mkx/nwr/fips-usa.htm>.

The manuals leave a little to be desired. For more help, there is a Yahoo group at <http://groups.yahoo.com/group/PRO-2051/> or <http://groups.yahoo.com/group/PRO-83/>. You can check for software at Scancat Lite <http://www.scancat.com/> or Butel software at <http://www.butel.nl/>.

Finally, the knobs on the Pro 2051 have a red painted marker. This is hard to see in low light so I painted over the red with whiteout.

57

Do you have a lot of radio hobby items you need close at hand, but little storage space? At a video store, I found a mini book case, designed for holding DVDs or VHS tapes, measuring 15 inches wide, by four feet tall and 10 inches deep. This is a small footprint that will fit in the smallest of places. It has adjustable shelves and the bottom one is deep enough to hold books, or large items. I have seen them at low-cost discount stores.

One Size Doesn't Fit All

Although many states have large trunked radio networks either in place or under construction, many counties operate smaller, local radio systems. This month we take a look at public safety radio activities in two typical counties of similar population but with different needs and requirements.

❖ Luzerne County, Pennsylvania

Some scanner listeners are casual listeners, just monitoring a couple of local frequencies on an occasional basis. Other listeners are real enthusiasts, monitoring hundreds of frequencies with multiple scanners. One such enthusiast recently sent me a comprehensive list of active frequencies in his area.

Hello, my name is Anthony and I am from Luzerne County, Pennsylvania. I am a 33-year-old male who has been into scanning since 1987. Over the many years I have collected a great number of scanners, and can't bear to part with any of them. My list of scanners is here:

Bearcat 210XLT	40 channel base
Bearcat 100XLT	100channel handheld
Bearcat 178XLT	100 channel base
Bearcat 890XLT	200 channel mobile/base
Sportcat 150B	100 channel handheld
Bearcat 895XLT	300 channel mobile/base trunk-tracker 1
Sportcat 180XLT	100 channel handheld alphanumeric
Bearcat 245XLT	300 channel handheld trunktracker 2
Bearcat 780XLT	500 channel mobile/base trunk-tracker 3
Pro-79	200 channel handheld
Pro-95	1000 channel handheld trunk-tracker
Pro-99	500 channel racescanner with CTCSS tone code
Pro-83	200 channel handheld scanner
Pro-97	1000 channel handheld trunk-tracker

I have three outdoor antennas: an SA-1 scanner antenna, a Scantenna, and a Radio Shack discone. I also have a large number of different handheld antennas. And last, a GRE Super-Amplifier for the handheld scanners.

In my area there are a lot of local scanner enthusiasts. There are also many great local scanning sites, of which one of them is mine.
<http://scannernut00.proboards41.com/index.cgi>

I put together a list of frequencies from my site that you will see below.

Luzerne County is in northeastern Pennsylvania, about a two-hour drive from New York City. The county has just over 300,000 residents and covers nearly 900 square miles of largely historic and rural countryside. There is no countywide trunked radio system – emergency services use dedicated conventional VHF and UHF frequencies to communicate.

Unfortunately, the State of Pennsylvania has committed to installing and operating an OpenSky radio network, making it incompatible with the much more common APCO Project 25 standards. Because there are no commercially available OpenSky scanners, it also makes it impossible for ordinary citizens to monitor the activities of their own government.

In the listings below you will see entries for L.E.I.N., which stands for the Law Enforcement Information Network. It is a essentially a computer database accessible by patrol officers to look up driving records, automobile registrations, arrest warrants, felony convictions, and so on. Although supposedly limited to official business, LEIN gained some notoriety a few years back when the Detroit Free Press reported that police abused the network in a number of ways. One popular pastime, apparently, was called “running a plate for a date,” where an officer would run the license plate of an attractive female and later give her a call or visit her at home. Other abuses included harassing law-abiding motorists and settling personal grudges.

County Police

155.595	Zone A Police (Westside)
158.985	Zone B Police (Central East)
155.565	Zone C Police (Central West)
155.535	Zone D Police (East)
158.745	Zone E Police (South)
153.860	Zone F Police (West)
156.225	Zone G Police (North)
155.415	Sheriff Department
154.740	County General Alarms (county repeater)
158.895	Wilkes Barre Police 1
156.090	Wilkes Barre Police 2
155.970	Wilkes Barre Police 3 Tactical
154.995	Kingston Police
156.210	Hazleton Police
154.770	County Constables
155.880	County Prison DCS-172
155.505	State Police Wyoming F-4 mode C (Base)
155.850	State Police Wyoming F-4 mode C (Mobile)
155.670	State Police Hazelton F-3 mode B (Base)
155.910	State Police Hazelton F-3 mode B (Mobile)
155.580	State Police Dunmore F-2 mode A (Base)
154.950	State Police Dunmore F-2 mode A (Mobile)
155.475	National VHF Calling / State Police F-9

155.460	State Police Tactical F-12
154.755	State Police unit to unit F-1

Local Police

155.010	Hanover Township
158.970	Hazleton F-2
465.0625	Hazleton F-3
154.965	Nanticoke F-1
154.710	Nanticoke F-2 Road
158.955	Nanticoke F-3
159.315	Nanticoke F-4 Police
158.865	Plains Township
154.115	Plains Township
155.130	Pittston F-1
150.995	Pittston F-2 road
155.250	West Side Police
155.610	Wilkes Barre Township
155.520	Freeland Borough
155.625	New Port Township
158.925	Jackson Township
155.640	Luzerne (Not in service)
155.985	Swoyerville
159.150	Duryea

These are the Luzerne County Fire and Emergency Medical Service (EMS) dispatch frequencies and firegrounds. Please note all firegrounds can be used by the local borough's Police, Fire, EMS and Road Services.

All Luzerne County Fire will be dispatched on the new county fire paging frequency of 157.450 MHz.

Fire

154.295	West Side Mutual Aid
154.445	Plymouth Fire and Ambulance
154.355	Back Mountain Fire and Ambulance
154.145	Fire North Dispatch
155.865	Fire East Dispatch
155.325	Fire West Dispatch
154.325	Fire South (Suburban Mutual Aid)
154.415	Mountain Top Mutual Aid Dispatch
155.940	Wilkes Barre City Fire and Ambulance
159.465	County Fire and Ambulance Repeater
157.450	County Fire and EMS Paging
158.835	Luzerne County Emergency Management Agency (Dispatch)
154.100	Luzerne County Emergency Management Agency (Mobiles)
855.7125	Luzerne County Emergency Management Agency

Emergency Medical Service (EMS) Dispatch

155.340	Advanced Life Support Dispatch Medics
155.265	Spellman Ambulance Service
155.160	EMS (Primary)
155.220	EMS (Secondary)
453.125	Lifelight
151.865	NuLife Ambulance Service
462.950	Countywide EMS Med-9 (Dispatch)
462.975	Countywide EMS Med-10 (Dispatch)
463.000	Countywide EMS Med-1
463.025	Countywide EMS Med-2
463.050	Countywide EMS Med-3
463.075	Countywide EMS Med-4
463.100	Countywide EMS Med-5
463.125	Countywide EMS Med-6
463.150	Countywide EMS Med-7
463.175	Countywide EMS Med-8
153.770	Fireground 1

153.950 Fireground 2
155.115 Kingston
155.085 Edwardsville (Channel 5)
156.030 Forty Fort Emergency Management Agency
154.205 Luzerne
152.285 Luzerne EMS
154.980 Larksville
155.985 Swoyerville
154.235 Wyoming
153.890 Plymouth Fireground
154.010 Plymouth Rescue
154.400 Plymouth Township
154.250 Exeter
154.340 West Pittston
156.135 West Pittston (mostly Road Department)

Back Mountain Fire 154.355

151.025 Lehman Township
151.775 Jackson Township EMS
158.925 Jackson Township
154.130 Harveys Lake
154.175 Harveys Lake (Kunkle)
154.220 Dallas
154.235 Trucksville
154.385 Sweet Valley
154.515 Northmoreland
158.865 Mount Zion

Fire North

154.430 BearCreek Township
155.775 Hanover Township
154.385 Laurel Run
153.905 Nanticoke
151.235 Nanticoke 2 (EMS?)
155.205 Nanticoke Emergency Management Agency
154.940 Nanticoke 1
155.625 NewPort Township
158.865 Plains Township
154.115 Plains Township (used by Police a lot)
153.830 Wilkes Barre
154.190 Wilkes Barre Township

Fire East 155.865

158.820 Avoca Fireground
153.920 Duryea Fireground
153.950 Laffin
151.100 Moosic 1
153.815 Moosic 2
154.145 Moosic 3
155.910 Moosic 4
460.6125 Moosic 5
158.865 Mount Zion
151.805 Old Forge EMS
153.965 Old Forge 1
154.265 Old Forge 2
158.880 Old Forge 3
453.475 Old Forge 4
153.740 Pittston City 1
155.745 Pittston City 2
156.740 Pittston City 3
151.010 Pittston City EMS
154.340 West Pittston 1
156.135 West Pittston 2

Fire West 155.325

159.060 Common Fireground
151.205 Nescopeck
153.830 East Berwick
154.160 Shickshinny/Hunlock Creek
154.280 Huntington Township/QRS

Mountain Top Mutual Aid 154.415

155.265 Butler Township EMS
154.220 Butler Township
154.160 Dennison Township
155.895 Fairview Township
155.820 NuAngola
154.250 Slocum Township

Hazleton Area/Suburban Mutual Aid 154.325

154.205 Fireground 1
154.295 Fireground 2
465.0625 Fireground 3
155.400 EMS Dispatch
151.745 EMS Tactical 1
159.780 Hazleton Advanced Life Support
154.385 Suburban Incident Command
154.010 Fireground 1
154.400 Fireground 2
150.775 Hazel Township
154.130 Hazel Township
151.490 Weatherly

153.770 Freeland
153.815 Conynham

County Fire Training Channel

159.060 And TRT Team

Department of Conservation and Natural Resources (DCNR)

151.385 Parks Department F-1
151.445 Parks Department F-2
151.175 DCNR forestry F-1
151.295 DCNR F-2
151.385 DCNR F-3
151.400 DCNR F-4
151.160 Forestry Statewide F-5
151.460 DCNR (Tactical)
151.445 DCNR F-6
159.285 DCNR F-7

State Fish and Game Communications

45.04 State Fish and Game (Statewide)
44.96 State Fish and Game F-2
44.84 State Fish and Game F-3
45.30 State Fish and Game (Water Patrols)
44.70 State Fish and Game
44.64 State Fish and Game F-1 (Statewide)
44.84 State Fish and Game F-2 (State Common)
44.88 State Fish and Game F-3 (Miscellaneous)

Department of Environmental Resources

Region 2 Northeast (Wilkes Barre)

151.385
151.175
151.385
151.175

DCNR UHF Frequencies

451.950
452.225
452.875
458.525

Security Frequencies

463.250 Wilkes Barre General Hospital
463.825 Mercy Hospital Security (new)
463.225 Moses Taylor Hospital Security
461.100 Wilkes College Security
461.600 Wilkes College repeater
154.085 L.C.C.C. College security
461.475 Steamtown Mall security
463.3625 Steamtown Mall security
461.900 Housing security in local development
463.525 Burns/Pinkerton at Sear Warehouse
461.900 Vector Security
461.300 Intrepid Detective Inc.
461.550 Intrepid Detective Inc.
460.975 National Guardian Security (Wilkes Barre area)
154.540 This is a MURS radio frequency but a lot of local security companies use this, such as Century Security
155.280 Giesinger Hospital security (old)
152.465 Giesinger Hospital security
157.725 Giesinger Hospital security input
463.350 Unknown security
464.550 First Valley Mental Hospital (only used during the day)
460.950 ADT security
166.200 Veterans Administration hospital police phone patch
152.360 Kings Security

463.675 Vector Security (channel 4)
151.655 Boscov's Security
151.955 Burns and Pinkerton (Dunmore area)
154.570 Burns and Pinkerton
463.525 Burns and Pinkerton
154.540 Burns and Pinkerton
154.600 Bluecross Security (Lake Security)
467.8125 Brinks Armor Services
464.375 CMC Hospital Security
464.575 CMC Hospital Security
155.295 Geisinger Medical Center (common)
155.205 GMC-Security and Transportation
155.220 GMC-Security and Transportation
155.280 GMC-Wyoming Valley Security
152.465 GMC-Wyoming Valley Security (repeater output)
157.725 GMC-Wyoming Valley-Security (repeater input)
463.875 The Downs Racetrack security
464.250 The Downs Racetrack security
468.350 Viewmont Mall security 1
462.550 Viewmont Mall security 2 (janitors)

Local Road Frequencies

159.075 Ashley Borough
156.045 Butler Township
155.040 Dallas Township
158.820 Duryea
155.085 Edwardsville (Ch.-5)
151.055 Exeter
159.015 Forty Fort
155.520 Freeland
151.025 Hazle Township
151.115 Hazleton
151.040 Hunlock
159.195 Larksville
155.115 Kingston
151.025 Lehman Township
151.235 Luzerne
159.390 Plymouth
156.045 Wyoming/West Wyoming
154.115 Plains Township (used by police a lot)
156.165 Wilkes Barre Township
153.905 Nanticoke pl-94.3
156.105 Salem Township
150.995 Pittston Township
151.040 Butler Township
151.085 Wilkes Barre
151.130 Wilkes Barre
156.045 Jackson Township
156.060 Noxen
156.075 Union Township
156.135 West Pittston
156.150 Ross Township
156.180 Wright Township
158.775 Hollenback Township
159.120 Wilkes Barre
159.165 Fairview Township
156.165 Wilkes Barre Township

Pennsylvania Department of Transportation

47.30 Base
47.38 Mobile
47.04 Base
47.20 Mobile
47.06 Base
47.08 Mobile
47.28 Car to Car
47.14
47.18
47.16
151.010 Motor Carrier Enforcement

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151.100 Motor Carrier Enforcement
 159.195 Motor Carrier Enforcement
 156.195 Roads and Bridges
 156.240 Roads and Bridges
 159.045 Turnpike Northeast repeater

Here is a list of all the great local scanning sites:

<http://luzernecounty.proboards13.com/index.cgi>
<http://cityfireforum.proboards33.com>
<http://www.geocities.com/Heartland/Valley/8919/>
<http://pascanner.proboards46.com>
<http://carbonemergency.proboards36.com>
<http://fordyce.org>

These are all great sites of which I a member or a moderator, so check us out if you're ever in the Keystone State.

— Anthony in Pennsylvania

❖ Washtenaw County, Michigan

Washtenaw County is situated in southeastern Michigan, about 30 miles west of Detroit. It's home to about 350,000 residents and includes the cities of Ann Arbor and Ypsilanti. An additional 70,000 daily commuters work in the county but reside elsewhere. Many of those folks work in the county seat of Ann Arbor, where the main campus of the University of Michigan is located.

Within the county there are twenty-nine emergency services agencies – 15 fire departments, 12 police departments, along with an ambulance agency and a hazardous materials (Hazmat) team. These agencies use a variety of incompatible radio equipment, and the county is looking to replace all of them with a \$30 million radio system. This upgrade would allow the agencies to more easily communicate with each other, while at the same time providing better coverage inside buildings and in the more remote parts of the county.

In 1986 the Washtenaw County Sheriff's Department and the police departments from Ann Arbor, Saline and Milan got together and installed what is now a Motorola Type II analog trunked radio system operating out of Ann Arbor. In 1998, in order to provide better coverage, the county built a second tower west of town on Jackson Road and co-located a repeater on the WEMU radio tower in Ypsilanti. Police and Fire Departments from Ypsilanti and Pittsfield Township then joined the system.

At the beginning of this year, the city Police, Fire and Emergency Management Departments began using their new consolidated dispatch center, termed Safety Services, on the second floor of Fire Station One on North 5th Avenue.

Today there are a total of five repeater sites licensed for this system. Four of them are in Ann Arbor and one is in Ypsilanti. Three of these sites are the busiest, licensed for the following frequencies: 851.0875, 851.1875, 851.2625, 852.0875, 852.1875, 852.2625, 853.1875, 853.2625, 854.0875, 854.1875, 855.0875 and 855.1875 MHz.

The first site is in Ann Arbor, west of the city, just south of I-94 on Jackson Road. The Ypsilanti site is on West Clark Road, roughly between Ypsilanti and Ann Arbor. It's north of the city, just across the Huron River from Eastern

Michigan University. All frequencies except 851.2625 MHz and 853.0875 MHz are licensed for this repeater.

A repeater south of the city is located at Briarwood Mall on South State Street, which is also licensed for operation on 853.0875 MHz. The other two Ann Arbor repeaters are both to the east of the city, one on Church Street on the eastern side of the University of Michigan campus and the other on Dean Road. These sites are licensed only for 851.1875 MHz.

Decimal	Hex	Description
6144	180	County Fire (Mutual Aid)
40976	A01	Ann Arbor (Sewer and Water)
41008	A03	Ann Arbor (Sewer and Water)
41040	A05	Ann Arbor (Sewer and Water)
41072	A07	Ann Arbor (Snow Crews)
41136	A0B	Ann Arbor (Traffic Signals)
41168	A0D	Ann Arbor (Emergency Operations)
41200	A0F	Ann Arbor Police (Parking)
41232	A11	Ann Arbor (Traffic Services)
41264	A13	Ann Arbor (Traffic Services)
41808	A35	Chelsea Fire (Dispatch)
41840	A37	Chelsea Fire (Truck-to-Truck)
45072	B01	Mutual Aid
45104	B03	Mutual Aid
45136	B05	Tactical 1
45168	B07	Tactical 2
45200	B09	County Fire (Tactical)
45232	B0B	Tactical 4
45264	B0D	Tactical 5
45296	B0F	Tactical 6
45328	B11	Tactical 7
45360	B13	Tactical 8
45392	B15	Tactical 9
45456	B19	Police (Tactical)
45488	B1B	Police (Tactical)
45520	B1D	Police (Tactical)
45552	B1F	Police and Fire (Tactical)
45584	B21	Pittsfield Township Police (Dispatch)
45616	B23	Pittsfield Township Police (LEIN)
45648	B25	Pittsfield Township Police (Car-to-Car)
45680	B27	Pittsfield Township (Tactical)
45712	B29	Pittsfield Township (Tactical)
45744	B2B	Pittsfield Township Fire (Dispatch)
45776	B2D	Pittsfield Township Fire (Truck-to-Truck)
45808	B2F	Ypsilanti Police (Dispatch)
45840	B31	Ypsilanti Police (Car-to-Car)
45872	B33	Ypsilanti Police (LEIN)
45904	B35	Ypsilanti Police (Detectives)
45936	B37	Ypsilanti Special Events
45968	B39	Ypsilanti Special Events
46000	B3B	Ypsilanti Fire (Dispatch)
46032	B3D	Ypsilanti Fireground
46064	B3F	Ypsilanti Police Local Government
46096	B41	Ypsilanti Police Local Government
46128	B43	Eastern Michigan University Public Safety (Dispatch)
46168	B45	Eastern Michigan University Public Safety
46192	B47	Huron Valley Ambulance Central Dispatch
46224	B49	Huron Valley Ambulance East (Wayne Co.)
46256	B4B	Huron Valley Ambulance Central Car-to-Car
46288	B4D	Huron Valley Ambulance East Dispatch
46320	B4F	Huron Valley Ambulance Event 1
46352	B51	Huron Valley Ambulance Event 2
46384	B53	Huron Valley Ambulance Supervisors
46416	B55	Huron Valley Ambulance Central (Washtenaw Co.)
46448	B57	Ann Arbor Police (Dispatch)
46480	B59	Ann Arbor Police (LEIN)
46512	B5B	Ann Arbor Police (Car-to-Car)
46544	B5D	Ann Arbor Police (Detectives)
46576	B5F	Ann Arbor Police (Tactical)
46608	B61	Ann Arbor Police (Tactical)
46640	B63	Ann Arbor Police (Special Events)
46672	B65	Ann Arbor Police (Special Events)
46704	B67	Milan Police (Dispatch)
46736	B69	Saline Police - Dispatch
46800	B6D	Regional Dispatch Authority 1
46832	B6F	Regional Dispatch Authority 2
46864	B71	Regional Dispatch Authority 3
46896	B73	Regional Dispatch Authority 4

46928	B75	Regional Dispatch Authority 5
46960	B77	Ann Arbor Fire (Dispatch)
46992	B79	County Fire (Dispatch)
47024	B7B	County Fireground
47088	B7F	Eastern Michigan University Public Safety
47120	B81	Milan Police (Car-to-Car)
47152	B83	Milan Police (Tactical)
47184	B85	Milan Police (Administration)
47216	B87	Milan Fire (Dispatch)
47280	B8B	Saline Police (Car-to-Car)
47312	B8D	Saline Fire (Dispatch)
47344	B8F	Saline Police (Administration)
47376	B91	Saline Fire (Fireground)
47408	B93	Saline Police and Fire (Tactical)
47440	B95	Saline (Dynamic Grouping)
47472	B97	County Sheriff (Dispatch)
47504	B99	County Sheriff (Car-to-Car)
47600	B9F	County Sheriff (LEIN)
47632	BA1	County Sheriff Detectives
47664	BA3	County Sheriff Tac-1
47696	BA5	County Sheriff Corrections: County Jail Transport/Court
47728	BA7	County Sheriff Marine Patrol
48720	BE5	County Sheriff Emergency Mgmt.
48752	BE7	County Sheriff Emergency Mgmt.
48784	BE9	County Sheriff Emergency Mgmt.
48816	BEB	County Sheriff Emergency Mgmt.
47536	B9B	Ann Arbor Fire (Fireground)
47568	B9D	Ann Arbor Fire (Truck-to-Truck)
47760	BA9	Ann Arbor Township Fire
47792	BAB	University of Michigan
47824	BAD	University of Michigan (Dispatch)
47856	BAF	University of Michigan (LEIN)
47888	BB1	University of Michigan (Car-to-Car)
47920	BB3	University of Michigan Special Events)
47952	BB5	University of Michigan Special Events)
47984	BB7	University of Michigan (Tactical)
48016	BB9	University of Michigan (Tactical)
48048	BBB	University of Michigan (Tactical)
48080	BBD	University of Michigan (Tactical)
48112	BBF	University of Michigan (Tactical)
48176	BC3	Michigan State Police
48208	BC5	Northfield Township Fire (Administration)
48240	BC7	Northfield Township (Tactical)
48272	BC9	Northfield Township Police (Dispatch)
48304	BCB	Northfield Township Police (LEIN)
48336	BCD	Northfield Township Police (Car-to-Car)
48400	BD1	Northfield Township (Tactical)
48432	BD3	Michigan State Police (Dispatch)
48464	BD5	Michigan State Police (LEIN)
48592	BDD	County Human Services
48624	BDF	County Juvenile Court
48656	BE1	County Transportation
48688	BE3	County Forensic Units
48848	BED	County Road Commission
48880	BEF	County Road Commission
49104	BDF	Chelsea Police (Dispatch)
49008	BF7	Ann Arbor School Buses (Dispatch)
49040	BF9	Ann Arbor School Buses (Secondary)
49072	BFB	Ann Arbor Schools (Security)
49136	BFF	Chelsea Police (LEIN)

They have a backup capability to use the University of Michigan trunked radio system if the main system ever fails; however, that system is near capacity and might not be able to handle the additional traffic.

The long-term plan for the county is to eventually migrate to the Michigan Public Safety Communications System (MPSCS). This statewide system is APCO Project 25 compliant and would give the county interoperability with the rest of the state. Because the MPSCS already has infrastructure in place, it would be the least expensive of the possible migration options.

That's all for this month. Please continue to send your frequency listings and scanner information to me via electronic mail at danveeneman@monitoringtimes.com. You can find more radio-related information on my website at <http://www.signalharbor.com>. Until next month, happy scanning!

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Mailbag: Answering Reader Questions

We get a lot of questions about stations that people cannot identify. This month Patrick Kerrigan wrote a snail-mail with several that are interesting enough to answer in the column.

First is **8554.0 kilohertz (kHz)** in upper sideband (USB):

"At least two men using tactical callsigns such as 'Kilo, Foxtrot' talking about making adjustments or reloading of software on a piece of equipment. Other callsigns heard were 'Charlie Delta, Romeo Golf, Golf Delta.' I believe that someone mentioned something about a Chief Sonar Technician. This is a rank and rate of a senior enlisted man in the U.S. Navy."

Yes, it's US Navy. Think of any Navy operation as a huge computer network, linking all participating units ("PU" or "Papa Uniform"). A variety of modes and frequencies are used for tracking and surveillance, as coordinated by the various tactical data links.

Like most military, the Navy comes up just about anywhere, though usually in the maritime bands. This particular frequency is in a narrowband direct printing allocation, but military voice is not uncommon here.

We almost never hear the actual information, which is exchanged "in the green" (scrambled), if it is mentioned on terrestrial radios at all. We're hearing the various coordination and troubleshooting activities related to keeping such a wide network working in real time. Control stations tend to have calls like "Foxtrot Tango."

The source can be a training exercise, an operating battle group, or just technicians shooting the breeze on the radio. The techs aren't always disciplined radio operators, and they've been known to say things that really shouldn't be going out in clear voice.

❖ All Greek to Me?

Moving along, this one was logged as **8735.0 kHz USB**:

"YL [Young Lady; any female voice] with transmissions in both Spanish and English about this marine radio-telephone service and the channel numbers available (803, 11232, 1640, 2217)... A few times it sounded like Bolivia Radio, other times it sounded like Policia

or Alicia Radio. The transmission was repeated over and over."

Well, it does sound like Spanish, and others have suggested Portuguese, but she's actually speaking Greek. It's one of those old-fashioned loops of a real human being (imagine that!), and it's distorted. It's a calling marker for SVO, Olympia Radio, in Greece.

The actual frequency is 8734.0 kHz. It's also heard worldwide on 13170.0 kHz and other frequencies. Olympia's vast antenna farm replaces several closed stations, such as Athens, which is now only a control point. It's a relatively new signal, as these go, and it confuses a lot of people.

Olympia is a rare catch here, but the Romania DX-tuner (<http://www.dxtuners.com>) grabs it just fine. I was able to get a pretty clear copy of the voice listening channels mentioned in the marker. They are numbers 806 (shore transmits on 8734, ship on 8210), 1232 (13170/12323), 1640 (17359/16477), and 2217 (22744/22048).

❖ Too Much Rum?

Next up is **10450.0 kHz**, on a Wednesday at 0301 UTC, straight amplitude modulation (AM):

"YL with number groups in Spanish. However, I was unable to figure out how many numbers in the groups. It sounded like two transmissions going at the same time on the same frequency... I assume this was from our friends in Havana."

This assumption is correct. It's most likely that we have yet another of Cuba's awesome technical screw-ups that these stations do so well. These broadcasts are recorded, and there have been many cases of them playing backwards, at once, or in the wrong mode (Morse code vs. AM voice). People have also heard major transmitter and circuit malfunctions, especially since the hurricanes. And, of course, there is the historic night when John Maky heard a parrot squawking under the tune-in carrier before a broadcast.

The correct frequency is likely 10446.0 kHz. The voice station, which starts off with "Atencion!" (*Attention!*), has kept up a frequent Monday/Wednesday schedule at 0300 UTC for well over a year now.

In fact, Internet records show that a Brooklyn listener caught this same broadcast in progress at 0320 UTC on 10446 on the night mentioned. However, he did not report any weird stuff. Either the Cubans had found the right combination of buttons and switches before he tuned in, or there was something else like multiple spurs or whatever happening four kilohertz up.

Of course, 10450 kHz is a prime spot for clandestine weirdness from several countries, so anything's possible. Pirate retransmissions of "numbers" stations have also become common, and one learns rather soon that nothing's too strange on shortwave.

❖ Party Night?

Finally, we have this one, on 8777.0 kHz USB:

"OM [Old Man, any male voice] with coded message (EAM). The announcer signed off as either Bookie or Rookie. While he was transmitting you could hear the other people in the communication center talking. I was waiting for him to tell them to shut up. I have heard a number of these over the years and found this one really unprofessional."

Well, yeah, people really should shut up when someone's on-mike, and this net is usually a lot better disciplined. The frequency, which is actually 8776.0, is used mostly for EAM ("Emergency Action Message") simulcasts by the Nightwatch airborne command post "doomsday" net, a most sober activity indeed.

Both 8776 and 13155 kHz are actually old US Navy outputs, which for years ran in parallel, circuit noises and all. Navy E-6B TACAMO (TAke Charge And Move Out) aircraft are major players in the Nightwatch mission, as well as the separate activities called TACAMO PAC (Pacific) and TACAMO LANT (Atlantic). They're the ones who talk to missile subs on very low frequencies.

"Bookie" is actually a callsign used by an Air Force fighter wing, but in this case it would have the usual two numbers after the name. Also, it is very unlikely that a fighter would be broadcasting EAMs. More likely "Bookie" or "Rookie" is another of the daily changing tactical callwords used by these US Strategic Command assets.

ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
ARQ	Automatic Repeat Request teleprinting system
CAMSLANT	Communication Area Master Station, Atlantic
CAMSPAC	Communication Area Master Station, Pacific
Coq-8	Coquelet-8, French teleprinting system
CW	Morse code telegraphy ("Continuous Wave")
DEA	US Drug Enforcement Administration
DGPS	Differential Global Positioning System
DSC	Digital Selective Calling
EAM	Emergency Action Message
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
FEMA	US Federal Emergency Management Agency
HFDL	High-Frequency Data Link
HF-GCS	High-Frequency Global Communications System
ICE	US Immigration and Customs Enforcement
ITA2	5-bit International Telegraph Alphabet #2
JSTARS	Joint Surveillance Target Attack Radar System
MARS	US Military Affiliate Radio System
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
MSK	Minimum-Shift Keying
MXI	Russian single-letter CW cluster beacon
MXIII	Solitary long-term single-letter channel marker
NATO	North Atlantic Treaty Organization
Navtex	Navigational Telex
PACTOR	Packet Teleprinting Over Radio
Piccolo	High-pitched British multi-tone teleprinting
PR	Puerto Rico
RTTY	Radio Teletype
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
Stanag 4285	Buzzy NATO standard radio modem
UK	United Kingdom
Unid	Unidentified
US	United States
VFT	Voice Frequency Telegraphy

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations have their ENIGMA (European Numbers Information Gathering and Monitoring Association) designators in ().

302.0	"263"-Identifier being used by Pt. Loma DGPS station, San Diego, CA, with stream of satellite corrections in MSK, at 2322. (Hugh Stegman-CA)
305.0	"85"-Identifier of Bakersfield DGPS station, CA, sending satellite corrections and own position in MSK, at 2359. (Stegman-CA)
318.0	Unknown-Very weak DGPS stream in MSK, possibly Chico, CA, at 0338. (Stegman-CA)
321.0	"265"-Identifier of Lompoc DGPS station, CA, weak signal with satellite corrections, rough MSK decode at 0250. (Stegman-CA)
518.0	ZSJ-South African Navy, Silvermine, Navtex in SITOR-B at 1635. (Bob Hall-RSA)
2252.0	"V-4-X"-US Navy, link coordination net with "5-I-W," at 1251. (Mark Cleary-SC)
2772.0	November Foxtrot-US Navy, Link-16 coordination with Lima, November, Sierra, and Papa, at 0133. (Cleary-SC)
2804.2	IDR-Italian Navy, Rome, with Stanag 4285 channel availability marker in 5-bit ITA2, also using 4225.2, 6315.9, 6331.7, and 8149.2, at 2348. (Day Watson-UK)
3048.4	Foxtrot-US Navy, link coordination with Delta, Hotel, Echo, and Oscar, at 1130. Similar activity on 3167.4 at 1049, 4068.0 at 0146, and 4372 at 2343. (Cleary-SC)
3203.6	"L"-Single-letter CW channel marker (MXIII), Tirana, Albania, usually on 3202.8, at 2005. (Ary Boender-Netherlands)
4210.5	A9M-Hamala Radio, Bahrain, CW identifier in SITOR-A marker,

at 1716. (Hall-RSA)	
4215.0	XSG-Shanghai Radio, China, CW identifier in SITOR-A marker, at 1645. (Hall-RSA)
4274.0	ZSC-Cape Town Radio, RSA, PACTOR marker at 1534. (Hall-RSA)
4294.7	FUE-French Navy, Brest, usual RTTY test loop at 2120. (Hall-RSA)
4317.9	NMG-US Coast Guard, New Orleans, FAX satellite image of tropical storm Arlene, at 0200. (Jeff Seale-KY)
4321.7	MGJ-UK Royal Navy, Faslane, encrypted RTTY message at 2116. (Hall-RSA)
4469.0	Florida CAP 904-US Civil Air Patrol net control, taking check-ins at 1134. (Cleary-SC)
4583.0	DDK-Hamburg Meteo, Germany, RTTY weather in English at 2126. (Hall-RSA)
4724.0	Fall Fish-US military exercise, broadcasting EAMs and taking aircraft traffic in 4-figure groups, also Identical and Test Box doing similar, at 0236. Judicate, with a 53-character EAM, preceding same from Offutt, who was simulcasting on 8992, 11175, and 15016, at 1622. (Jeff Haverlah-TX)
5696.0	Coast Guard Rescue 1712-US Coast Guard HC-130H, working CAMSLANT and District 7, FL, on a search at 0338. (Allan Stern-FL)
5732.0	OPB-DEA OPBAT (Operations, Bahamas and Tortugas), ALE with J40 on COTHEN (Customs Over-The-Horizon Enforcement Network), at 0548. LNT-UC Coast Guard CAMSLANT, VA, ALE with J09 on COTHEN at 1732. Coast Guard 1502-US Coast Guard HC-130, setting radio guard with CAMSLANT at 2322. (Cleary-SC)
6348.0	FUE-French Navy, Brest, Stanag 4285/ ITA2 marker, at 1210 and 1604. (Watson-UK)
6519.0	WLO-Mobile Radio, AL, broadcasting tropical storm advisories and traffic lists at 0500 and 2300. (Stern-FL)
6694.0	Pathfinder 03-Canadian Forces, working Halifax Military, at 0141. (Cleary-SC)
6712.0	Continental 38, HFDL position for Reykjavik at 0239. (Seale-KY)
6720.0	"U-8-T"-US military exercise, with several EAMs simulcast on 8992 and 11175, at 0150. (Haverlah-TX)
6771.5	Unid-Probably UK, Falkland Islands, with two 6-tone Piccolo channels in VFT, at 2245. (Watson-UK)
6883.0	"Y-1-Z"-US military exercise, with several EAMs, also using HF-GCS and possibly 6903 discrete, at 0216. (Haverlah-TX)
6985.0	USACE1010-US Army Corps of Engineers, DC, ALE sounding at 0244. (Ron Perron-MD)
7508.0	ZSC-Cape Town Radio, RSA, RTTY maritime weather, parallel on 13538, at 0940. ZSJ-South African Navy, Silvermine, FAX weather charts, parallel 13538, at 1030. ZSJ with weather in RTTY, parallel 13538, at 1712. (Hall-RSA)
7527.0	X60-US joint task force, ALE with OPB (DEA, Bahamas), on the COTHEN net at 1710. Coast Guard 1720-US Coast Guard, patch via Service Center (US ICE) to District 7, regarding a large search at 1838. PAC-US Coast Guard CAMSPAC, CA, ALE with F29 at 1901. (Cleary-SC)
7722.3	FDI8-French Air Force, Nice, RTTY test loop at 0754. (Watson-UK)
8040.0	TF131-Alabama National Guard, ALE sounding at 2303. (Perron-MD)
8192.0	9MR-Malaysian Navy, RTTY traffic in Malay, at 1606. (Hall-RSA)
8337.6	15C-US Coast Guard helicopter calling Shark 26, drug interdiction at 2331. (Rick Baker-OH)
8414.5	TCHF-Turkish vessel Gokay-K, with many DSC distress calls, from 0341 to 0356. KRPW-US vessel PFC William B Baugh, DSC distress calls at 0446 and 0449. (Watson-UK)
8425.5	XSG-Shanghai Radio, China, CW identifier in SITOR-A marker, at 1528. (Hall-RSA)
8452.0	RFFMEA-French Navy, RTTY test loop at 2100. (Hall-RSA)
8478.5	FUF-French Navy Djibouti, Stanag 4285/ ITA2 marker, at 2252. FUF-French Navy, Ft De France, marker at 2312. (Watson-UK)
8500.0	VTH1/5/7-Indian Navy, Bombay, RTTY maritime weather at 1611. (Hall-RSA)
8646.2	VTP6-Indian Navy, Vishakhapatnam, working ships in CW, at 1537. (Hall-RSA)

- 8788.0 WLO-Mobile Radio, AL, voice synthesized weather and traffic list at 0303. (Seale-KY)
- 8912.0 Razorback-Unknown drug mission, working Omaha 547 (US ICE) during vessel interception at 1519. (Cleary-SC)
- 8968.0 JNRSPP-US Air Force Secure Internet Protocol Routing Network entry, PR, ALE with tanker 553141DAT, at 1858. (Perron-MD)
- 8971.0 Island 22-US military, working Blue Star (relocated US Navy Tactical Support Center, possibly Comalapa, El Salvador) on pursuit of a smuggler at 0041. (Cleary-SC)
- 8980.0 Coast Guard 1712-US Coast Guard HC-130, working Miami Ops on a search, at 1802. (Cleary-SC)
- 8983.0 Coast Guard Rescue 2113-US Coast Guard, getting search coordinates from CAMSLANT at 0004. (Stern-FL) NRCB-US Coast Guard training barque Eagle, position for CAMSLANT at 0020. (Baker-OH)
- 8992.0 Reach 408-US Air Force, unsuccessful patch to Diego Ops via Hickam HF-GCS, HI, at 1328. Red Talon 712-US Navy P-3C, patch via Puerto Rico HF-GCS to Fiddle (USN, FL), at 1953. (Cleary-SC)
- 9007.0 Stargate-US Air Force E-8 JSTARS, patch via Trenton Military to Peachtree (Robins AFB, GA), at 1802. (Cleary-SC)
- 9025.0 Coast Guard 1504-US Coast Guard C-130, ALE-initiated patch to District 7, on a search at 1825. (Cleary-SC)
- 9065.0 USAAAD-US Army Air Assault Division, ALE sounding at 0608. (Perron-MD)
- 9079.5 RFQP-French Forces, Djibouti, ARQ idler at 1555 and 1608. (Hall-RSA)
- 9190.0 61B-Venezuelan Navy vessel Capana, working T63, vessel Gajaira, ALE at 0627. (Perron-MD)
- 9982.5 KVM 70-US military station used by weather service, Honolulu, giving this call sign in a FAX cloud feature chart, at 0545. (Stegman-CA)
- 10100.8 DDK9-Hamburg Meteo, Germany, RTTY weather codes at 1252. (Watson-UK) DDK, with RTTY weather at 1646. (Hall-RSA)
- 10151.5 V1A-Probable US Army, calling V16 in ALE at 0252. (Perron-MD)
- 10155.0 RIW-Russian Navy, Moscow, calling RJD93 in CW, at 1505. (Watson-UK)
- 10182.0 TWLC-Spanish Guardia Civil, Cantabria, ALE test message for TZSH, Huelva, at 1626. (Watson-UK)
- 10182.7 Unid-Egyptian MFA Cairo, passing SITOR-A traffic to Kuwait, at 1600. (Watson-UK)
- 10275.0 BDECP2-Probable US Army alternate Brigade Command Post, calling 29CP, in ALE at 0329. (Perron-MD)
- 10493.0 WGY912-FEMA Special Facility, Mt. Weather, VA, calling WGY993 at 1239. (Cleary-SC)
- 10536.0 CFH-Canadian Forces, Halifax, NS, noisy FAX weather chart at 1002. (Watson-UK)
- 10547.0 FDG-French Air Force, Bordeaux, RTTY test loop, and gone at 1055. (Watson-UK)
- 10683.0 PNR400-DEA, Bahamas, sounding in ALE at 0022, 0122, 0253, 0354, 0424, and 0454. (Watson-UK)
- 10816.5 XIE-Unknown unit calling HQ7, Army National Guard, VA, ALE at 1648. (Perron-MD)
- 10872.0 "C"-Russian Navy, Moscow, CW beacon (MXI), at 0816. (Watson-UK)
- 11039.0 DDH9-Hamburg Meteo, Germany, with RTTY marker giving other frequencies as 147.3 and 14467 kHz, then weather in German at 1830. (Watson-UK)
- 11175.0 Reach 3077-US Air Force Air Mobility Command tanker, patch via Sigonella HF-GCS to Rhein Main, at 0153. (Cleary-SC) Deer Tag, taking 4-figure "Skymaster" exercise traffic from many aircraft at 0236. Teal 13-US Air Force Reserve WC-130J, patching Miami Hurricane Center via Puerto Rico HF-GCS with weather observations, at 2044. [Apparently satellite comm wasn't working. -Hugh] (Haverlah-TX) Offutt-US Air Force HF-GCS, with EAM at 2105. (Seale-KY) Lance 11-Exercise traffic with many stations, at 2347. (Stern-FL)
- 11205.0 Teal 45-US Air Force Reserve WC-130 "Hurricane Hunter," checking in with Smasher (FL), at 2304. (Cleary-SC)
- 11232.0 Peach 11-US Air Force E-8 JSTARS, patch via Trenton Military to Peachtree Ops, Robins AFB, GA, at 1655. (Stern-FL) Money 01, patch via Trenton to Tinker AFB Meteo, at 2153. (Cleary-SC)
- 11244.0 Unknown-Weak station with uncopyable call, with a very long (likely 165 character) EAM, at 1553. (Haverlah-TX)
- 11315.0 HP-1378-Copa Airlines 737, HFDL gate information from New York for Panama City, at 2245. (Seale-KY)
- 11384.0 Continental 24, HFDL position for Shannon at 0150. (Seale-KY)
- 11494.0 53A-US joint task force, working Panther (DEA, Bahamas), at 2216. (Cleary-SC)
- 12067.0 White Lightning 03 Tango-US military, calling Wolfman, finally raised White Lightning 09, at 1507. (Jack Metcalfe-KY) [Similar callsigns were heard on this freq in 2000. ?? -Hugh]
- 12087.0 2B-Probable US Army, ALE with 2G, at 1931. (Perron-MD)
- 12132.0 BR1-Brazilian Army headquarters, Brasilia, ALE with BA1, Bahia, at 2257. (Perron-MD)
- 12537.0 61B-Venezuelan Navy vessel Capana, ALE with CGA, Navy headquarters, also using 9190 and 13500, at 0529. (Perron-MD)
- 12789.9 NMG-US Coast Guard, New Orleans, FAX of Arlene's predicted track, at 1935. (Seale-KY)
- 13031.2 RFLIE-French Forces, Ft. de France, Stanag 4285/ITA2 marker, at 2015. (Watson-UK)
- 13042.5 FUV-French Navy, Djibouti, Stanag 4285/ITA2 marker at 0830. (Watson-UK)
- 13200.0 Reach 550-US Air Force, patch to Smasher (DEA, Bahamas) via Puerto Rico HF-GCS, at 1951. (Cleary-SC)
- 13276.0 Northwest 780, HFDL position for San Francisco at 2046. (Seale-KY)
- 13315.0 Lufthansa 8210, HFDL position for Santa Cruz at 0100. (Seale-KY)
- 13405.0 Unid-Unknown station with offline encrypted CW 5-figure groups, ended "58 58 25 25 ttt", at 1957. (Watson-UK)
- 13927.0 JSTARS 88-US Air Force E-8C, MARS patch via AFA1EN, OH, with formatted traffic for Peachtree Ops, GA, at 1510. Reach 1001-US Air Force, going to 20992.5 at 1745. Dark 69-US Air Force B-1B, patch to Dyess AFB concerning an air show flyby, at 1752. (Stern-FL) JSTARS 84, patch to Peachtree at 1924. (Cleary-SC)
- 13972.0 RS3-Brazilian search and rescue, ALE with CER, Brazilian Air Force, Cerrado, also using 13224, at 0136. (Perron-MD)
- 13977.0 AFA1EN-US Air Force MARS, working several stations in an administrative net, at 1601. (Cleary-SC)
- 15016.0 Wooden 71-US Air Force tanker, patch via Ascension HF-GCS to McGuire AFB Meteo, at 2138. (Cleary-SC)
- 15025.0 Reach A612 Heavy-US Air Force, working Smasher enroute to Soto Cano, Honduras, at 1229. (Cleary-SC)
- 15043.0 HIK-US Air Force, Hickam AFB, HI, ALE with JTY, Yokota, Japan, at 0403. (Perron-MD)
- 15088.0 CAMSLANT-US Coast Guard, calling CG 2131 at 1607. (Cleary-SC)
- 16144.5 SKYWAT-US Army Skywatch, Honduras, ALE sounding at 2035. (Perron-MD)
- 16333.0 BR1-Brazilian Army, headquarters, Brasilia, ALE with PR1, Parana, at 2315. (Perron-MD)
- 16351.5 RFFA-French Ministry of Defense, Paris, ARQ idler at 1618. (Hall-RSA)
- 16355.0 SARBR-Brazilian Rescue Coordination Center, Brasilia, ALE sounding at 0053. (Perron-MD)
- 16607.0 ERMSAL-Brazilian Navy, Salvador, ALE with FRADEM, frigate Rademaker, at 2142. (Perron-MD)
- 16813.0 UAT-Moscow Radio, Russia, CW identifier in SITOR-A marker at 0725. (Hall-RSA)
- 16819.3 NMN-US Coast Guard CAMSLANT, CW in SITOR-A marker at 0950. (Hall-RSA)
- 16820.0 IAR-Rome Radio, Italy, CW marker at 0729. (Hall-RSA)
- 16830.7 SVO-Olympia Radio, Greece, CW marker at 1545. (Hall-RSA)
- 16961.5 FUF-French Navy, Ft. de France, Stanag 4285/ITA2 marker at 2234. (Watson-UK)
- 17147.0 URL-Sevastopol Radio, Russia, CW marker at 1640. (Hall-RSA)
- 17982.0 HERMES-Brazilian Air Force headquarters, ALE sounding at 0045. (Perron-MD)
- 18183.4 7RQ20-Algerian MFA, Algiers, Coq-8 flash traffic in French to Luanda, Angola, at 1627. (Hall-RSA)
- 19036.5 Unid-Algerian embassy, Luanda, Angola, Coq-8 message in French to MFA Algiers, at 1622. (Hall-RSA)

NAVTEX: Information at Sea

This month we take a look at NAVTEX, a low cost marine weather and distress information system which provides the digital listener with another interesting catch with the minimum of equipment and cost.

❖ What is NAVTEX?

Operational since the 1980s, NAVTEX (NAVigational TELeX) is comprised of a worldwide network of coast stations broadcasting weather, navigational and maritime distress and warning information to ships at sea. NAVTEX is one component of a largely automated international system called GMDSS (Global Maritime Distress and Safety System). It is primarily intended for delivering local information, with most stations covering a range of about 200 miles. Certain ships are required to carry NAVTEX equipment, and most agencies operating NAVTEX stations recommend that vessels at sea listen to at least four broadcasts a day in order to see full benefit from the service anywhere in the world.

In the US, NAVTEX stations are operated by the US Coast Guard, and the service combines data from the National Weather Service and the USCG. There is no charge for using the system.

❖ Where Can I Find NAVTEX?

Most stations in the network transmit on the fixed frequency of 518 kHz. Recently, however, European stations have also begun to use a new NAVTEX frequency allocation of 490 kHz. Sometimes 424 kHz is also used. The US does not use 424 or 490 kHz at present, but is considering another alternative frequency of 4209.5 kHz. New Orleans has been chosen as the test station for this latter frequency.

Stations transmit using standard 100bd/170Hz shift SITOR-B, a fact which makes NAVTEX a very easy catch with the minimum of digital decoding equipment.

❖ When Can I Find NAVTEX?

NAVTEX is a worldwide 24 hour system. As one can imagine, the broadcast areas of one station overlap with others in the region. To minimize potential interference and maximize coverage, the globe has been split into 16 navigational regions (NAVAREAs), with one

station in each NAVAREA transmitting about 5-10 minutes of information on a 4-hour cycle in the same timeslot. Language is usually English, though there are transmissions in French, Spanish and other languages particular to a given station's coverage area.

NAVTEX stations are known by a single letter identifier unique within a NAVAREA, though they all have standard ITU registered callsigns, too. Since the coverage areas of stations are relatively small for the frequency used and stations transmit on a cycle, it is rare to hear more than one station at a time and hence it is fairly obvious from where a given signal originates. Most shipboard NAVTEX receivers allow the user to program the desired single letter identifier for a station and the receiver automatically wakes at the scheduled time to print any reports sent.

The current US NAVTEX schedule, according to the USCG, is found in Table One.

Table One: US NAVTEX Schedule

J	NOJ	Kodiak, AK	0300, 0700, 1100, 1500, 1900, 2300
X	NOJ	Kodiak, AK	0340, 0740, 1140, 1540, 1940, 2340
W	NMW	Astoria, OR	0130, 0530, 0930, 1330, 1730, 2130
C	NMC	Point Reyes, CA	0000, 0400, 0800, 1200, 1600, 2000
Q	NMQ	Cambria, CA	0045, 0445, 0845, 1245, 1645, 2045
V	NMV	Marianas/Guam	0100, 0500, 0900, 1300, 1700, 2100
O	NMO	Honolulu, HI	0040, 0440, 0840, 1240, 1640, 2040
F	NMF	Boston, MA	0045, 0445, 0845, 1245, 1645, 2045
N	NMN	Chesapeake, VA	0130, 0530, 0930, 1330, 1730, 2130
E	NMN	Savannah, GA	0040, 0440, 0840, 1240, 1640, 2040
A	NMA	Miami, FL	0000, 0400, 0800, 1200, 1600, 2000
R	NMR	San Juan, PR	0200, 0600, 1000, 1400, 1800, 2200
G	NMG	New Orleans, LA	0300, 0700, 1100, 1500, 1900, 2300

Note: Savannah, GA, is keyed by NMN in Chesapeake.

❖ What Will I Need to Receive NAVTEX?

Firstly, you will need a receiver and antenna capable of operating at 518, 424, and 490 kHz. A very modest setup will almost certainly guarantee reception of the local stations, but a better antenna will pull in stations from much further afield, particularly at night. For example, here at Digital Towers, we can regularly hear stations across the US, Canada, Caribbean and the North African coast.

Here is part of a typical NAVTEX message from US station "A" in Miami, FL:

zczc aa38
ccgd7 bnm 0762-05
1. ga-fl-cumberland sound-fernandina hbr to

kings bay-cumberland
sound upper rge c rear lt (llnr 6855) rep
missing a dayboard.

2. cancel at time//310500z mar 05//
nnnn

Note the standard teletype codes "zczc" denoting start of message and "nnnn" at the finish. The first letter of the code after the "zczc" gives the identity of the sending station.

With NAVTEX being broadcast with standard SITOR-B, there is a very wide selection of hardware and software available for decoding the transmissions.

❖ NAVTEX Hardware

For the boater or devoted NAVTEX listener, there are a number of hardware decoders, some combined with printers, like those from Furuno (see Resources).

❖ NAVTEX Software

For Windows, the stand-alone soundcard or hardware-interfaced programs (some of them free) like Hamcomm, RadioRaft, JVComm, MMTTY, SEATTy, TrueTTY, and SkySweeper will all decode NAVTEX.

For Mac OS X, Multimode is a safe bet. There is also software available for the Linux OS. All of the semi-professional decoders from Wavecom and Hoka will also decode NAVTEX.

You can always check Utility Monitoring Central's decoder hardware and software pages for the full details and links to software developers and manufacturers.

That's it for this month, enjoy the digits from the high seas.

Resources

USCG NAVTEX Page - <http://weather.gov/om/marine/navtex.htm>
Admiralty Radio Signals List - <http://www.ukho.gov.uk/alrs.html>
UMC's Software Decoders Page - <http://www.chace-ortiz.org/umc/hardware.html>
UMC's Hardware Decoders Page - <http://www.chace-ortiz.org/umc/software.html>
Furuno Marine Electronics - <http://www.furuno.com>

Trends in Tropical-Band Broadcasting

Anker Petersen of Danish Shortwave Club International, who maintains the Domestic Broadcasting Survey (formerly Tropical Band Survey), says, "We are approaching the end of the Era of Domestic broadcasting on the Tropical Bands for two main reasons: The technical standard of a large part of the transmitters in the tropical countries is poor and they cannot be repaired for economical reasons. In more developed countries the domestic shortwave transmitters are being replaced by FM-networks.

"My forecast is now that within the next five years domestic stations on the tropical bands are going to disappear in several more countries in Africa, Central and South East Asia, Central America, Ecuador, Venezuela, Guyana and Suriname. Worldwide the last station may disappear around year 2017."

He appends a frequency list of tropical band stations which closed in 2003-2004, and a table of the ever-declining numbers of such stations in different regions of the world over the years. For instance, Indonesia has dropped from 171 stations in 1973 to only 17 this year; Caribbean from 29 to 1 in the same period. But not all areas are dropping: Papua New Guinea remains about the same. The entire article is available only to DSWCI members. Openly accessible is a separate list of ac-

tive Latin American domestic SW stations in 2005: http://www.dswci.org/specials/frequency/200506_Active_Latin_Americans.pdf

Introducing "Shortwavemusic"

Myke Weiskopf is a sound designer, composer, freelance writer, and shortwave geek from Cambridge, MA, founder of the record label Obscure-Disk, which has produced several archival volumes of shortwave broadcasts, and he co-hosts the "Listening Lounge," an annual all-night free-for-all of shortwave and related recordings, at the Winter SWL Fest in Pennsylvania with NPR's David Goren.

Myke says, "It is something of a disease of ours in the shortwave hobby to chase logs and contacts but to lose all sight of the actual content we are hearing, to dig deeper into the voices, the sounds, the context. We hear stations, but it seems that we so rarely listen. It is no wonder that stations are no longer eager to QSL, faced with such programmatic indifference from their audience."

Now Myke has a new soundblog, ShortWaveMusic, with musical excerpts from shortwave intercepts recorded over the last decade: <http://shortwavemusic.blogspot.com> We enjoy and recommend it.

AFGHANISTAN [non] from Salaam Watandar comes this e-mail: I'm afraid we're no longer responding to QSL requests: we just don't have the resources or time. Thanks for your interest and sorry, David Trilling (Ian Cattermole, NZ, NZ DX Times)

ALASKA On June 22 at 1400, KNLS no longer heard mixing with France in Vietnamese via Japan on 9795, so I asked KNLS if they had moved as I suggested (gh) Hello Glenn, Yes, we have moved at 1400 UT to 9555. We hope this change will work! (Kevin Chambers, KNLS, DX LISTENING DIGEST) 9555 audible here on a good day, but too much Habana 9550; once RHC was missing for a couple of minutes at 1430 so I could hear one of Carl Mann's DX talks. KNLS is better at 1200 on 9615 (gh, OK)

ALBANIA [and non] Worst clash I witnessed in a long time on 7120 at 2130 – two powerhouse signals of about equal strength but 10.8 Hz apart, so resulting mess further disfigured by a terrible, fast sub-audible heterodyne (SAH). R. Tirana in English and HFCC says the Chinese transmitter is Urumqi, a high power rig (Kai Ludwig, Germany, DXLD) See also CHINA

ANTARCTICA E-mail from LRA36 says they don't have any QSL cards; I had sent them a report since reception is now interference-free (César Pérez Dioses, Perú, DXLD) Mid-July e-mail from announcers Claudia, Andrea & Mabi says they broadcast M-F 1800-2100 UT on 15476, with 2 kW, rhombic antenna, Spanish programs, plus English and other language IDs. Ira36@infovia.com.ar (Gabriel Iván Barrera, Argentina, Japan Premium)

ARGENTINA R. Continental heard on feeders: 8098-LSB, 0758-0833, ID and news on the hour (Kouji Hashimoto, Japan Premium) And on 5400.0-LSB, 0741 soft songs with YL DJ talk to 0800, then usual Informativo Continental (Takeshi Sejimo, Japan, Radio Nuevo Mundo)

BELGIUM [non] Vlaams Beland, a.k.a. Zwart of Wit (Black or White in Dutch) changed frequency again, from 13680 to 15660, Sundays 0900-1100 via Armavir, Russia, 250 kW, 284 degrees to WEU (Observer, Bulgaria) With typical Tblisskaya 1050 Hz tones before 0900 (Kai Ludwig, Germany, DXLD) VT Communications was unwilling to carry Zwart of Wit/VB6015, based on the unease that we feel following the numerous links that have been made with an extreme political group in Belgium (Nick Gilboy, VT Sales Manager via Mike Barraclough, WDXC)

BOLIVIA Several new Bolivians have shown little interest in reception reports from abroad. R. Estambul, in Guayaramerín, 4498, appears to be an exception. In an e-mail to Gert Nilsson, in Sweden, the owner, Mrs. Felima Bruno de Yamal, says she was pleased to receive his p-mail report sent to Calle Loreto, esquina Primero de Mayo, Guayaramerín, Beni.

She would be happy to receive pennants and flags from listeners' hometowns in order to embellish the studio. Also: ninafelima@hotmail.com (Henrik Klemetz, Sweden, DXLD)

R. Virgen de Remedios, Tupiza, Potosí, which had been varying around 9.2 MHz finally made it to the announced band of 90 m (gh) 3335.7 to 3336.2 at 0000-0105, Christian songs nonstop 0000-0058, complete ID at 0059, and joining Radio Católica Mundial via satellite at 0100. The next morning at 1056-1101 it was on 3340.2 (Arnaldo Slaen, Roque Pérez DX Camp, Argentina, HCDX)

Alex Muir and eleven team members made it through customs with 600 solar powered fix-tuned Galcom radios, to reach Quechua-speakers around San Pedro de Buena Vista, where the first 300 radios were to be distributed, the other 300 destined for the lowland jungle area of Shinahota (Galcom International newsletter) The favored station for fix-tuned and sealed radios to prevent recipients from trying to retune them to godless secular stations, or even those of other religions, is R. Mosoj Chaski, 3310v (gh)

BRAZIL I got a very surprising QSL card from Rádio Caiari, Porto Velho, 4785 with a two-page letter after more than 4 years of waiting (Kurt Norlin, Sweden, SW Bulletin) V/s Alisângela Lima. Nice answer after almost 5 years! With new cards they are clearing out the backlog of reports. The QSL-station of the year (Jan Edh, ibid.)

BURMA [non] Democratic Voice of Burma, at 1429-1530 now on three frequencies: 15480, 17625, 5910 (Iwao Nagatani, Japan, DXLD) All different sites (gh) And heard at 2345-0029* on 9435, Burmese talks and covers of western music, 0004 ID sequence (Mark Taylor, WI, DXLD) This one via Jülich, Germany, from *2330 (gh)

CANADA CKZU, 6160, Vancouver, coming in very nicely during VOA-Philippines' hour off, at 1318-1345 over daylight path, ID during local morning show North by Northwest, mentioning 690 and a couple of relay frequencies, but strangely enough, not the SW frequency (gh, OK)

CHILE Voz Cristá move from 15475 to 15485 resulted in another collision, this time with BBCWS, already on 15485 for many years, to N&W Africa, currently until 1700. VC usually on top here, but we counted a SAH of almost 4 Hz from BBC at 1346 (gh) VC was atop BBCWS here in Portugal at 1431 (Carlos Gonçalves, DXLD) The 15475 collision was resolved, but Voz Cristá still has others. 6110 in Portuguese interferes even in CNAm with R. Japan in English via Sackville at 0500-0600; 6070 overnight in Spanish for years has ruined CFRX Toronto reception in North America. See also FALKLAND ISLANDS (gh)

CHINA Reporters Without Borders notes that R. Free Asia, VOA and V. of Tibet are all jammed systematically. Thanks to acquisition of ALLISS antennae made by the French company Thalès, Chinese authorities have

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; A-05=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated

improved their jamming capabilities. Installed above all in the far north-western city of Kashi, they are used to jam international radio signals (Media Network)

RADIO TIRANA [see also ALBANIA] English on 7120 at 2130 is now covered almost 100% by CRI in Hungarian. It seems there is a communication problem between Tirana and Beijing [despite Chinese aid to Albania]. Could also be another case of HFCC logic that since transmissions are targeting different zones they cannot be interfering with each other (Olle Alm, Sweden, DXLD)

COLOMBIA Russell Stendal's Colombia Para Cristo ministry has requested 100,000 dual-band SW radios costing \$20 each (Galcom International). They actually mean that these will tune only two frequencies instead of only one frequency, i.e. Voz de tu Conciencia 6010, and 5910v, which has been testing with Marfil Estéreo programming. See also BOLIVIA (gh) LVC's two frequencies also heard on mixing products with both stations audible at same time, all measured: 5709.26, 5809.82, 5909.07, 6010.12, 6110.29, 6210.43 and 6310.58 kHz (<http://www.malm-ecuator.com>)

Argentine DXer Rubén Guillermo Margenet started a campaign to persuade LVC to get off 6010, where it causes heavy interference to R. Mil, México, in North America and even in Europe. This led to a lot of discussion mainly on the *Conexión Digital* list, with some backing one station, some the other. Rafael Rodríguez in Colombia has been advising LVC; says it did not choose 6010, but was assigned it, and will not move unless reassigned. A protest by R. Mil was made at the time, but ignored by the Ministry of Communications. However, LVC has modified its antenna to diminish signal toward México. As for 5910, that was still testing and adjusting with Marfil Estéreo programming. It will soon switch to a totally new program service originating in Bogotá (gh) Stendal then offered to turn off his 6010 transmitter at a certain time each week so R. Mil's DX program, currently suspended because of LVC QRM, could be heard, and/or to broadcast the program on his station. In the Southern Cone, LVC is difficult to hear with Inconfidência, Brasil also on 6010, besides low-power stations in Chile and Uruguay (Margenet, Noticias DX)

ECUADOR Most mornings in June and July, before and after 1300, we were hearing DRM noise on 15370-15380, presumably HCJB as before, causing QRDRM to Holy Qur'an station, Sa'udi Arabia on 15380, obviously another plot by Christian Crusaders against Islam :-). Searched DRM forums, and there was NO mention of 15375 since Feb, nor was it on any of the three versions of current DRM schedules. No one told DRM monitors about 15375, so no one tried it. Bandscanning is not something they do. Get a frequency, punch it in, but no random tuning in the DRM mode. If they did, it would be rather unproductive with so few DRM signals as of yet. When you are bandscanning in analog, you sure notice a DRM signal right away, even if you can't listen to its content (gh)

ETHIOPIA [non] Target program Tensae Ethiopia - Voice of Unity (via Russia on 15660) has its own website: <http://www.tensae.com> giving contact phone/fax numbers in USA and Germany, and two e-mail addresses: tensae.ethiopia@gmail.com ("Europe"), ethiopia44@yahoo.com ("USA"). Also audio files (Bernd Trutenau, Lithuania, DXLD)

FALKLAND ISLANDS [non] CRI via Chile in Portuguese at 2100-2200 moved from 11720 to 11690 (Observer, Bulgaria) Following up last month, so 11720 should be clear for BBCWS Calling the Falklands from the UK, Tue & Fri 2130-2145 on 11720. We had notified the Voz Cristiana frequency manager of this problem; also collided with VOA at 2100-2130 (gh)

FRANCE Foreign-language sections at RFI are very much treated as second-class; there is a disparity in their budgets. Foreign language funding is 2/9 of the amount for French language (Satellifax via Jean-Michel Aubier) Not like VOA, where the national language is treated as second-class (gh)

GAMBIA [non] 9405, "Save the Gambia Democracy Project," via Juelich, *2000-2030* Saturdays only, announcing regular broadcasts for the next 24 months (Anker Petersen, Denmark, DSWCI DX Window)

GREECE For previews of *Hellenes Around the World*, Sat 1400-1500 via Delano 9775, check http://www.voiceofgreece.gr/en/omogeneia_ekpompes.asp?catid=148 which is not always up-to-date (gh)

GUINEA 7125, Radio Guinea, Conakry, formerly well heard in the mornings between 0540 and 0710, was missing in June (Manuel Méndez, Spain, DXLD) In early June, a thunderbolt damaged the transmitters of Radio Télévision Guinéenne (RTG) in Sonfonia, on the outskirts of Conakry. This prevented broadcasting on SW. Government appealed to "friendly countries" for assistance, and after one month China handed over a spare part so SW could resume on 7 July. RTG technicians say a renovation is necessary to ensure reliable performance (Boubah.com via Media Network) Heard already July 6 at 1704-1709 (Mikhail Timofeyev, near St. Petersburg, Russia, HCDX) Back July 7 at 2205, July 8 at 0632 with vernacular music, French (Manuel Méndez, Spain, DXLD)

INDIA All India Radio is going to vacate the 90 metre band altogether in favour of 60 metre band for domestic shortwave services. So Shimla on 3223, Bhopal on 3315, Delhi on 3365 and Gangtok on 3390 will soon move onto the 60 metre band. It is expected that there will be some adjustments on the present 60 metre band usage by All India Radio (DXAsia via Media Network) Why?

INDONESIA On several dates in July, VOI was varying around 15136+ instead of 15150v between 1600 and 2100 (Wolfgang Büschel, Germany, DXLD) 15136.13 in English at 2030 and also 0825, both // 9524.9 (Masahiro Umemura, Japan, WWDXC via Büschel) Government called on radio stations to close down between 1800 and 2200 UT to save energy (Media Network) Does that include VOI external service? Could have

started by turning off open carrier at 1400-1600 on 9525 (gh) Then 15 MHz channels were empty at 1800, still on 9524.89 (Büschel)

IRAN IRIB, 11860, near local level signal on a Sunday with mailbag in English at 2010, rather funny with American-accented announcer taking cracks at listeners (Terry L Krueger, FL, DXLD) Also on 9925, 9800, 7205 at 1930-2027 (Observer, Bulgaria)

ISRAEL In mid-June, IBA postponed making a decision regarding cessation of SW, until there is a Board of Governors of the IBA. No major decisions are being made until the Board is formed. As a result, shortwave broadcasts continue past June 2005 (Doni Rosenzweig, DXLD) Another extension on existing schedule (Moshe Oren, BEZEQ, *ibid.*)

Kol Israel REKA (Immigrant Absorption Network), opened new, mostly English, website: <http://reka.iba.org.il> with news headlines, language schedule, contact info in each, history, pictures of staff (Doni Rosenzweig, DXLD)

ITALY R. Maria was to test DRM using a PC as modulator, on 26000 with only 25 watts; see photo of site http://www.mediasuk.org/archive/index_e.html For reception report: Radio Maria, Via Mazzini 15, 21020 Casciago (VA), c/o Ing. Claudio Re, Ing. Giacomo Querio (Han Hardonk, BDXC) By mid-July it was still in AM, not DRM, heard daily between 1740 and 2040 or as late as 2200, including news from Vatican Radio (Carlos Gonçalves, Portugal, DXLD) He must get it by sporadic-E due to distance and falling sunspots (gh)

JAPAN You'd think R. Japan would have English to NAM at prime morning hour of 7 am PDT/MST, 8 am MDT/CST, but this is the best we can do: tho beamed from Yamato to S Asia, NHK Warudo news in English at 1400 UT can be clearly audible on 11730. Per Eike Bierwirth the only others then are 7200 direct to SEAs, and 11840 via Sri Lanka to Oceania (gh, OK)

KOREA SOUTH [and non] KBS World Radio, 9650 at 1200 buried under Voice of Korea [North]. P'yongyang on 9650 until 1250 blocking Sackville here in AZ, but I can hear the last ten minutes with perfect copy (Rick Barton, DXLD) What, a coincidence?

LAOS Lao National Radio, Houa Phan, monitored in mid-June on 4677.9 ex-4649, on air from 0957 to 1230 and relays news from Vientiane at 1200, // 6130 (Kenji Takasaki, Japan, HCDX)

LIBERIA In mid-June on 5470, at 2150-2220, something with classic religious music until 2200, then gospel music. Radio Veritas tests? (Luca Botto Fiora, Italy, DXLD) Next day at 2000 poor, but VOA English program recognized at until 2100, then African accented local program, ID as R. Veritas, pop songs like James Brown (Jari Savolainen, Finland, *ibid.*) Soul music at 2245, ID with 97.8 FM and 5470, *Lord's Prayer* and off 2300 (Mike Barraclough, UK, *ibid.*) Radio Veritas ID at 2129 mentioning the Catholic Media Centre, Monrovia, during news or current affairs program (Mark Veldhuis, Netherlands, *dxing.info*)

QSL by e-mail says: Station is owned and operated by the Catholic Archdiocese of Monrovia. "Thanks a million for the reception report. The transmitter power is 10 kwatt but at present we are only powering 6 kwatt. Do look forward to more of such reports on the morning frequency of 6090 kHz from 0600." Ledgerhood Rennie, Station Manager, radioveritas@hotmail.com (Savolainen, DXLD) 6090 colliding with DGS Anguilla (gh) Another day until 2311* whisper-quiet talks between two men (Scott R Barbour Jr., NH, *ibid.*)

[non] At 0700-0800 July 5, a VT-Merlin test loop on 9525. I phoned Merlin, only to be told that site, power, beam heading are confidential; that was after first denying the existence of the broadcast and implying it didn't come from them! (Brian Mulleady, Scotland, HCDX) Also July 10 at 0808-0850 (Ron Howard, CA, DXLD)

On Tuesday 12th July 2005, STAR radio Liberia begins short wave broadcasts over Liberia & the Sub region, which are aimed to reach the entire population of Liberia and the neighboring countries, initially for three hours daily, at 0700-0900 on 9525, 2100-2200 on 11965. STAR radio was reopened on 25th May [on FM] after having been forcibly closed down by the then President Charles Taylor in March 2000. STAR radio is a Liberian not-for-profit organization, in partnership with the Hironde Foundation - Media for Peace & Human Dignity, Switzerland. Contacts in Monrovia: Mr. James Morlu, STAR radio Station Manager, +2316.518.572 starradio_liberia@yahoo.com (Hironde via Bill Westenhaver, DXLD)

9525, S7 level at 0830 7/12 with English "trumpeting" the new service (Steve Bass, OH, DXLD) Very poor first day from 2100 on 11965 with het from what? Better the next day (gh, OK) Decent signal here (Jari Savolainen, Finland, *ibid.*) Quite good here (Tokusa Hiroshi, Japan, *ibid.*) 11965 from just before 2100 first with news in English, later not sure if English or heavily accented, 2129:30 to silent carrier; kept listening until 2143 but no further audio (Larry Cunningham, OH, *ibid.*) Excellent here at 2100 on 11965 (Tony Rogers, UK, BDXC-UK) Sudden opening at 0700 on 9525, S6 (Noel R. Green, UK, DXLD) Very weak until 0900* (Dave Kenny, BDXC-UK) Site for both is Ascension, 250 kW, 27 degrees (Observer, Bulgaria)

LIBYA [non] LJBC's V. of Africa started new broadcasts July 1 with the 5th African Union summit in Srit (Media Network blog) Heard new 7320 at 2228 in English with [partial] schedule:

1200-1300 21695 Eaf Swahili
1300-1400 21695 Eaf English, C/N/SAF 21675
1600-1700 17695 Waf French, C/N/SAF 17870
1700-1800 17695 Waf Hausa, C/N/SAF 17870

Address: The General Center for Directed Broadcasting, Voice of Africa, PO Box 4677, Tripoli, Libyan Great Jamahiriya; Fax 00 218 21

Shortwave Broadcasting

444 9875; Tel 00 218 21 444 0112 and 00 218 21 444 9206 round the clock (Christopher Lewis, UK, DXLD) 7320 opens at *2200 with French news segment at 2220, otherwise Arabic until 0010 English announcement. Until now LJB relays via France were scheduled only from 1000 to 2130 (Kai Ludwig, Germany, DXLD) 7320, also at 0139-0235, French until 0145, Arabic until 0215, unlabeled language (possibly an Arabic dialect) until 0225, English 0225-0235. Clear English ID several times during English segment (Mark Taylor, WI, *ibid.*) What is its total span on 7320? A long time since VoA had English in prime North American time (gh)

MAURITANIA Is 4845 off the air? Usually audible here even with poor propagation (José Hernández, Spain, July 5, *Noticias DX*) Blasts in when it is on, must be inactive but surely will come back in a few days (Manuel Méndez, Spain, *ibid.*) 4845 & 7245 silent for quite some days, while MW 783 remains regular (Carlos Gonçalves, Portugal, *World Of Radio*) No great loss since they are obsessed with reading the Kor'an (Dario Monferini, Italy, *playdx*)

MÉXICO XEXQ, Radio Universidad de San Luis Potosí, 6045, returned to the air on June 24 after more than a month off while it relocated transmitter and antenna from the center of the city to the outskirts; they make quite an effort to be heard with 250 watts (Julian Santiago Díez de Bonilla, XEOL, via Dario Monferini, *playdx*)

XEXQ is one of my favorite DX stations from decades ago; now I am hearing it again at various times from 1200 as late as 1400; the weak signal depends on noise level and how much interference there is from Inner Mongolia(?) also on 6045, causing at least a SAH. On an unusually stormy day, 6045 was strongest station on band, exceeding even Australia 6020. Has newscast after 1300, otherwise mostly classical music. Rudimentary webpage <http://www.uaslp.mx/Plantilla.aspx?padre=1912> with a few photos and program grid only for FM, XHUSP 88.5, probably not the same as on 1460 and 6045 (gh, OK) R. Mil interference on 6010: see COLOMBIA

MONGOLIA You can try for a V. of Mongolia QSL card if you have any current / old loggings. Response is very fast from OM/YL Densmaa, VOM mail editor, Mr@mongol.net or densmaa9@yahoo.com (Swapan Charaborty, India, DXLD)

OMAN R. Sultanate of Oman opening in English on 15140 at 1400 July 10, excellent, scheduled daily to 1500; had been off the air several months (Dave Kenny, BDXC-UK)

PAPUA NEW GUINEA Catholic Radio Network, 4960, 0840 with church service, beautiful choir, not at all indigenous-sounding; still audible at 1402, two hours after sunrise, with instrumental music (Walt Salmani, Grayland, WA DXpedition, DXLD) Much poorer signal than Wantok Radio light, but congratulated them at 1347 (Guy Atkins, *ibid.*)

RUSSIA Nice to have R. Station Pacific Ocean (Tikhiv Okean), back on a regular basis: 12065 *0835-0900*. Sign-on mentions Vladivostok; chimes, then news interspersed with variety of music (Ron Howard, CA, DXLD)

SLOVAKIA According to a TASR (Slovak press agency) report of 12 July, Radio Slovakia International leaves shortwaves on 31 July 2005; will continue with international broadcasting via internet and satellite only. 84 employees will be discharged. The director general of Slovak Radio, Jaroslav Reznik blames the government for the bad financial situation of the station. So let us wait if the missing money will be found or not before the end of July. Nothing is definitive yet (Karel Honzik, Czechoslovak DX Club, HCDX)

RSI then began publicizing this and asking for listener support, rather than producing new programs in Spanish and English and four other languages. Spanish DXers such as José Bueno and José Miguel Romero mounted a campaign of support including writing to consulates and embassies, the president of Slovakia and his press secretary (*Noticias DX*)

Of the 84 redundancies, 21 would be at RSI, said the English webpage. English schedule is/was: 0100-0130 Ams 5930 9440; 0700-0730 Au/Oc/SAs 9440 15460; 1630-1700 WEu 5920 7345; 1830-1900 WEu 5920 6055 (gh) The Minister of Culture, František Toth, then intervened in the matter, calling for a meeting July 19 to find other means to continue financing RSI (via José Miguel Romero2, *shortwave yg*) RSI English page then provided a number of E-mail address for messages of protest; presumably settled one way or the other by the time you read this. Check <http://www.slovakradio.sk> (gh)

SOMALIA [non] R. Horyal tested via Germany, one Fri at 1730-1800 on 15650, the next on 11925, but did not continue, just Sat-Thu 1730-1800 via Samara, Russia on 12130 (*Observer*, Bulgaria)

SRI LANKA SLBC All Asia Service, 15748, announced at 1400 June 10 that the evening service at 1225-1535 would be terminated the next day; sad news from a long-time favorite of mine (Christer Brunström, Sweden, *SW Bulletin*) Yes, it's off as well as // 9770, very sad news as the then Commercial Service of Radio Ceylon was one of the first stations I heard on SW over 50 years ago (Noel R. Green, England, DXLD) One of my favorites, too; can still be heard from before 0030 on 9770 (Steve Bass, OH, swl@qth.net) Morning 0025-0430 still on 6005, 9770 and 15748, maybe for a few more months. Indian languages continue as before, but then for how long? It is like hearing that an old friend has passed away (Victor Goonetilleke, DSWCI DX Window)

SUDAN QSL from Pete(r) Stover of Edmedia with more info about R. Peace in southern Sudan. 4750 and 5895 are in daily use, but with different programs and patterns. 4750 has 1 kW for southern Sudan in six languages including English. 5895 is 5 kW for central and northern Sudan

in English and Arabic (Jan Edh, Sweden, HCDX) 4750 at 0230-0320, starting in English, and 1630-1720 (Rumen Pankov, R. Bulgaria DX via John Norfolk) English ID 0259, talks and choir vocals, CODAR QRM (Rich D'Angelo, PA, NASWA Flashsheet)

[non] V. of Sudan, 8000, of the SPLA, may soon disappear as rebel leader John Garang has returned to Khartoum after 22 years to become vice-president, following the January peace accord (Gabriel Iván Barrera, Argentina, *Conexión Digital*)

Sudan Radio Service, 15325 via UK, good at 0515 with extensive ID in Juba Arabic, some English bits translated. Full schedule with language segments at <http://www.sudanradio.org/schedule.htm> shows English at 0300-0345 and 1500-1545; the evening broadcast duplicates the morning broadcast, same am and pm: M-F only, 0300-0500 UT 11665, 0500-0600 15325, 1500-1800 17660. Note the 0500 immediately follows on Mon and Tue another Sudan service, Radio Nile via Madagascar on adjacent 15320 at 0430-0500 (gh, OK)

UGANDA [non] R. Rhino Int'l Africa said it had to reduce broadcasts to two days a week starting in July, Wed & Fri on 17870 at 1500-1530 (Bernad Trutenau, Lithuania, DXLD) Via Germany

USA Kenneth Y. Tomlinson is hiring yet more consultants in an effort to try and refashion the workings of publicly funded broadcasting. Not PBS this time, but VOA. IBB says that it has hired the consulting firm of Booz Allen Hamilton to "undertake a review of the organization and structure of [Voice of America] and IBB." Consultants, as we all know, are usually brought in to provide cover for management intent on making some big changes. As Corey Pein pointed out, VOA is "being supplanted by a new model, something closer to MTV than the BBC. Voice people are nervous about the future of journalism at their network, some fearing it will be replaced by pure propaganda." (Paul McLeary, *CJR Daily*)

WWCR has filed an application with the FCC for two more 100 kW SW transmitters and two antennas (George McClintock, CE & GM, WWCR, DXLD) So that will increase WWCR capacity one and a half times! (gh) Does WWCR plan more of the same on these senders? (John Filiozzi, NY, DXLD) I'd be surprised if not. However, certain overseas broadcasters desperately in need of a North American relay, would be well advised to contract for the necessary airtime now. Such as All India Radio, Radio Pakistan, R. Tashkent, V. of Indonesia, R. Cairo, R. Romania International, Radiodifusión Argentina al Exterior - trouble is, the powers that be probably don't know they need WWCR, and would not even consider such a drastic step without a lot of persuasion. I'm sure WWCR would be glad to do business with them, as it has in the past, e.g. with RTE. I just picked a few obvious prospects; countries which do maintain an external SW service in English, but are difficult to hear in North America (gh)

WWRB, 6890 heard on spurs plus and minus 35 kHz, on 6855 at 0218 and 6925 at 0325-0414 with Brother Stair (Harold Frogge, MI, *MARE Tipsheet*) 6855 not to be confused with WYFR fundamental (gh) WWRB 9320 around 1300 with B.S. also puts out noisy spurs on 9300, 9340 (gh)

VANUATU R. Vanuatu, 7259.685, fair with modern western music but vanished at 0625. By 0642 audible on 3944.86 with identical format, presumably same transmitter. Good strength but weak modulation past 0815 ID (Walt Salmani & Guy Atkins, Grayland, WA, DX-pedition, DXLD)

VIETNAM [non] Little Saigon Radio, based in US, testing via Taiwan on 11540 at 1130-1200, 7380 at 1500-1530; is on internet 24 hours and AM stations in CA and TX; see <http://www.littlesaigonradio.com> (Bernad Trutenau, Lithuania, *Conexión Digital*) 7380 was later replaced by 15110 (Trutenau, DXLD) 7380 not via Taiwan but via Nakhorn Sawan, Thailand (Wolfgang Büschel, DXLD) That's the BBC relay site, until now used only for BBC (gh)

ZANZIBAR V. of Tanzania had been missing from 11734.1 for several months (gh) July 11 an historic date in African DX: back on exactly 11735.00 at 1630 in Swahili (Vlad Titarev, Ukraine, BCDX) News in English at 1800-1808, otherwise in Swahili as "Sauti ya Tanzania, Zanzibar," including news at 1900 and 2000. Nice selection of music, too (Tony Rogers, BDXC-UK) Caught sign-off at 2100 with anthem, fair on clear channel (Mike Barraclough, UK, DXLD) News in English at 1800-1810 IDs as "Spice FM" (Alokesh Gupta, India, and Jari Savolainen, Finland, *ibid.*) Could this now be a relay from somewhere else? (Walt Salmani, *ibid.*)

Seemingly a new Chinese-made 100 kW transmitter, similar to ones erected at Shijak, Albania, Kashi, China, and at La Habana, Cuba in past year. Modulation excellent, so feederline also refurbished (Wolfgang Büschel, Germany, *ibid.*) Remarkable strength, sufficient for casual outdoor listening with the ATS 909. Quite exciting, since I never heard them before. And quite a surprise (Kai Ludwig, Germany, DXLD) Also weakly audible here until 2100* on a poor propagation day (gh, OK)

ZIMBABWE [non] On June 24, SW Radio Africa said it had been saved from closure, would continue on MW 1197 [Lesotho] at 0300-0500, but not on SW (Media Network blog) SW via UK, 15145 at 1700-1800, was informally extended until it finally disappeared after July 8, nothing but the jamming on July 9 (David Pringle-Wood, Harare, DXLD) Manager Gerry Jackson did not say where the money had come from, but indications were that the station was now safe for another year. The award-winning radio station needs close to £100,000 every month to remain in operation, according to insiders (New Zimbabwe via Mike Terry) Nice article about SW Radio Africa, at Borehamwood, Hertfordshire: <http://tinyurl.com/9c52g> (Andy Sennitt, DXLD)

Until the Next, Best of DX and 73 de Glenn!

0004 UTC on 7440

UKRAINE: Radio Ukraine Int'l. Good signal for English news of war in Iraq and Ukrainian troops role there. Mentions of Ukrainian companies doing business in Iraq, followed by talk on the Russian Army and Black Sea Fleet. (Joe Wood, Greenback, TN; Tom Banks, Dallas, TX)

0006 UTC on 5926.8

BOLIVIA: Radio Minería (tentative). Spanish. Echo effect announcement and possible ID. Regional music, talk, ads and musical bridge. Signal extremely weak and almost impossible to detect an ID routine. Bolivians audible: **Radio Eco** 4409.76, 0010: **Radio Emisoras Camargo** 3390.25, 0030-0040: **Emisora Pío XII** 5952.47, 1000-1033. (Arnaldo Slaen, Buenos Aires, Argentina) Tentative log on **Radio San José** 5580.3, 0043-0102. (Scott Barbour, Intervale, NH) **Radio Santa Cruz** (tentative) 6135, 0120-0144. (Wood, TN)

0050 UTC on 11690

LITHUANIA: Radio Vilnius. English commentary on emergency communications and services in Lithuania. Mentions of "milk-bar" and menu of bakery items served therein. Sign-off routine with ID and interval signal. (Wood, TN) 9875 at 2345. (Bob Fraser, Belfast, ME)

0144 UTC on 6925 USB

PIRATE: Grass Cutter Radio and Sunshine Radio. Joint broadcast of these two pirates. Several IDs from both and music from Lou Reed's (tentative) *Sweet Jane*. Poor to fair signal quality. Pirate-**The Crystal Ship** audible 6854, 0144-0125. (Wood, TN) Euro pirate **Mystery Radio** 6220, 0256-0320. (D'Angelo, PA)

0204 UTC on 9495

IRAN: Clandestine-Voice of Justice. First log of this station. Male/female's English text and interview of former US Senator of the Democratic Party. Station ID at 0504 to items about Gitmo Bay. "You are tuned to the Voice of Justice." (Wood, TN)

0235 UTC on 4939.7

VENEZUELA: Radio Amazonas. Spanish conversations to Latin vocals at 0256. Station off without a usual national anthem, although carrier lingered for another nine minutes. Poor to fair signal quality. (Rich D'Angelo, PA/NASWA Flash Sheet) 0957-1002. (Slaen, ARG)

0234 UTC on 11925

BRAZIL: Radio Bandierantes. Portuguese. Announcer's banter between music tunes. Fair signal was // 9645. Brazil's **Radio Guarujá Paulista** 5045, 0835-0848. Jingles, announcements with fair signal quality on // 3385. (Barbour, NH) **Radio Nacional da Amazonia** 6185, 0004-0015. (Wood, TN) **Nossa Radio** 4905, 0236-0257*. (D'Angelo, PA) **Radio Inconfidencia** 6010.06, 0950-0954. (Slaen, ARG)

0307 UTC on 7290

SAO TOME: VOA relay. English commentary on Liberian elections. SIO 443+. (Frodge, MI) 11975, 1941-1955 *Africa News Now* program. (Barbour, NH)

0745 UTC on 3235

BRAZIL: Radio Guarujá. Portuguese. Braz pops to 0800 identification and freq quote. Good signal for this and additional Brazilians: **Radio Cultural** 4465, 0830; **Radio Educadora** 3375, 0915; **Radio Educacao Rural** 4754.5, 0930; **Radio Caiari** 4785, 0950. (Fernando Garcia, Baltimore, MD) **Radio Cancao Nova** 4825, 0912-0918; **Radio Novo Tempo** 4895, 2337-2345. (Slaen, ARG)

0835 UTC on 4918.98

ECUADOR: Radio Quito. Spanish. Latin pops and romantic tunes. Occasional IDs as "Radio Quito la voz de la capital." Signal very strong and overmodulated as usual. (Slaen, ARG) **HCBJ** 9745, 2330-2345 Spanish. (Wood, TN)

0851 UTC on 9719.93

PERU: Radio Victoria. Spanish. Religious sermon of fair signal quality, // 6020.28 stronger and clearer signal quality. Peru's **Radio Sicuani** 4826.46, 1002 with IDs. (Slaen, ARG)

0858 UTC on 3290

PAPUA NEW GUINEA: Radio Central. Pleasant island style music to announcer's updates and station ID. "NBC" national network news feed on this and // 3325 **Radio Bougainville**. (Slaen, ARG) PNG's **Radio East New Britain** 3385, 0945-0950. (Chuck Bol-

land, Clewsiton, FL/Cumbre DX) Tentative log on **Wantok Radio Light** 7120, 1006-1022. (Barbour, NH)

0900 UTC on 3945

VANUATU: Radio Vanuatu. Vernaculars. Announcer's news text format to regional island style music. Fair to poor signal for announcer break-ins and presumed local banter. (Sam Wright, Biloxi, MS)

0915 UTC on 4790

INDONESIA: RRI-Fak Fak. Koran recitations to 0917. Good signal for male/female's announcement and Islamic music to 0930. Indo station audible; **RRI Sorong** 4870, 0919-0943; **RRI Serui** 4604.95, 0922-0930; **RRI Ambon** 4845.21, 0930-0941. **RRI Jakarta** 9680, 0935-0945. (Bolland, FL) 9524.9, 1058 with IDs and web addresses. (Slaen, ARG) **Voice of Indonesia** 15150, 1634-1647. (Barbour, NH)

1300 UTC on 11710

NORTH KOREA: Voice of Korea. Martial music to clear identification from male announcer. News script with martial music pauses. Radio Japan's Japanese service noted under signal beamed to Central America. (Fraser, ME)

1539 UTC on 17770

SOUTH AFRICA: Channel Africa. English commentary on shortage of medical personnel in Zambia, and text on Walk-a-Thon for worldwide hunger. ID at 1551. **Radio Sondergrense** 3320, 0245-0253. (Wood, TN)

1639 UTC on 17595

GERMANY: Deutsche Welle. Male/female duo with European news topics. ID as "Deutsche Welle Radio". SIO 2+53. (Frodge, MI) 9440, 2133-2200* English/German, *Hits from Germany* program. (Barbour, NH) **Voice of Croatia** via Germany 9925, 2223-2340. (Wood, TN)

1640 UTC on 17605

FRANCE: Radio France Int'l. Report on local music festival // 15605, 17850. (Fraser, ME) Euro news and "RFI at your doorstep" 17605, 1633-1652+. (Frodge, MI)

1843 UTC on 9785

TURKEY: Voice of. Report on Turkish agriculture followed by program of Turkish classical music. (Fraser, MA)

2018 UTC on 11600

CZECH REP: Radio Prague. Report on artists' coffee house. (Fraser, ME) 17485, 1659-1702+ with interval signal and ID into newscast. (Frodge, MI)

2225 UTC on 5469.96

LIBERIA: Radio Veritas. Pretty decent signal from tune-in for *Saturday Night Dance Party* program. Announcer's mention of "5470 kHz in the 60 meter band." Signal seemed to decline a bit, and the audio level was quite low from 2256 when there was a prayer. Quick music bridge at 2300 and closing announcements with reading of the *Lord's Prayer*. Invitation for listeners to tune in again for their morning broadcast. Programming seemed to stop at 2305, carrier off a few minutes later. (Jerry Berg, Lexington, MA/NASWA Flash Sheet)

2301 UTC on 15720

NEW ZEALAND: Radio NZ Int'l. World news including US topics. Weather update for Auckland and the North Island. Poor signal hampered by fading and static. (Wood, TN) 9885 at 1115. (Fraser, ME)

2315 UTC on 5975

ASCENSION ISLANDS: BBCWS relay. America's Cup pre-racing trials. (Fraser, ME) 7160, 0302-0307 with BBC news // 7120. (Frodge, MI)

2336 UTC on 4965

ZAMBIA: Christian Voice. Contemporary Christian vocals hosted by lady's English text. Station identification and address at 2350, followed by program previews and music during a fair signal. (D'Angelo, PA)

*Thanks to our contributors – Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times
(or e-mail gaylevanhorn@monitoringtimes.com)
English broadcast unless otherwise noted.*

Digital Shortwave Makes Its Move

Well, here we are in September – traditionally considered the start of the radio DX season. What are some of the things this new year has in store for DXers?

❖ DRM

Digital Radio Mondiale apparently is poised to take a significant leap forward. There have been several significant technological developments and new products this year; but the most important took place last winter.

Back in January, RadioScape and Texas Instruments announced their joint development of a specialized DRM module that could be mass produced and, therefore, integrated into lower-priced all-in-one receivers. Up to this point, DRM reception has been possible primarily through the unwieldy combination of a properly modified shortwave receiver and a Windows-based PC running specialized software. In addition, the first all-in-one DRM radios, lacking this key “chip solution,” sold for upwards of \$1000US. While valuable for testing purposes, these options were hardly a recipe for mass market consumer success.

However, right now at the IFA 2005 (Berlin’s consumer electronics fair) being held from September 2-7, the first, low-cost prototype portables, car radios and kitchen radios are to be on display. Prices for the receivers are expected to be between 99 and 199 Euros (roughly \$100-\$250), depending on the complexity of the features they possess. They are due to be in European shops in time for the Christmas sales.

New DRM product: USB radio for DRM (number 1)



100% Coding Technology World Traveller USB DRM/AM/FM receiver

The Coding Technology World Traveller USB DRM receiver is small, the size of a packet of cigarettes and is powered directly from the USB connection. Intended for business travelers who are already likely to be carrying a laptop PC, it provides DRM reception as well as covering all of the traditional analogue AM and FM (VHF) bands. It is available, via the Internet, from Coding Technologies, <http://www.codingtechnologies.com/>.

In addition to DRM, these first radios will be capable of receiving analog short, medium and long wave, FM and in some cases also DAB (digital audio broadcasting). This ability to receive DAB as well as DRM may be key, because it will create an additional real incentive for consumers to purchase the new digital radios in those countries already conducting significant broadcasting in the DAB standard. In part for that reason, the DRM consortium will initially target as key markets, Germany, the Benelux countries and France. In preparation for this eventuality, the consortium has already ensured plenty of interesting content in broadcasts to that region. (See Table 1.)

Of course, the fact that DRM officialdom has identified a first objective by no means limits the imagination or ingenuity of listeners and hobbyists outside Europe. I think we can say with confidence that receivers on the market in Europe will soon thereafter find their way across the Atlantic, with or without official sanction, and with them perhaps a whole new form of DXing – not to mention the much hoped-for improved listening quality.

(For further information on the IFA, enter the phrase “IFA 2005” into your favorite web



Some of the first DRM receivers will be built around Texas Instruments & RadioScape technology

browser. The url is far too lengthy to type in. The IFA has an interesting and wonderfully constructed multimedia web site, well worth the visit.)

❖ RTI Revises Program Line-Up

R. Taiwan International has made some significant midsummer changes to its nightly program schedule. RTI still airs its one hour broadcast to the USA/Canada at 0200, 0300 and 0700 UT, with the 2200 transmission to Europe also well heard in North America. Find frequencies and a key to day abbreviations in MT’s Shortwave Guide. Here’s the new line-up:

- :00 - D News
- :10 - S The Undiscovered Country; M Made in Taiwan; T Strait Talk; W Trends; H Ilha Formosa; F Bookworm; A News Talk.
- :20 - S Taipei Magazine; M Asia Pacific; T We’ve Got Mail!; W Jade Bells and Bamboo Pipes; H People; F New Music Lounge; A Groove Zone.
- :40 - S Stage, Screen and Studio; H Instant Noodles.
- :45 - M Let’s Learn Chinese.

❖ A New DX Country?

As of this writing, we were poised to lose Radio Slovakia International but had just gained Star Radio in Liberia, albeit via Ascension Island. Then came this unexpected announcement.

Amateur Radio Victoria (Australia) reported on July 14 that something called the Hutt River Province Principality announced plans to begin shortwave broadcasts and seek ARRL amateur radio DXCC entity status as

Pictures by Radio

The Mayah DRM 2010 receiver is a fully functioning prototype of a consumer radio. Over 200 units have already been sold to companies interested in DRM.

At the “Le Radio!” exhibition in Paris, the BBC demonstrated news headlines, stories and thumbnail pictures received via the DRM 2010 receiver. The news data was transmitted from VT Communications Rampisham transmitting site in Southwest England on the same frequency (and at the same time!) as the normal BBC World Service programme.



BBC & VT Communications demonstrate “News to PDA” data application

well as other international radio recognitions. Furthermore, it had banned the use of Broadband over Powerline (BPL) – that most recent bane of HF communications – within its borders. So, just where and what is this apparent paradise for weary, long put-upon DXers?

The Hutt River Province is located just north of Geraldton, Western Australia, about 40 miles north of Perth. On visiting its web site (<http://www.hutt-river-province.au>), one is greeted by a photo of HRH Prince Leonard and, presumably, his princess wife with an immediate invitation to e-mail the place. Clicking on the picture of the “royal” couple, one sees a picture of a road sign which – sure enough – points the way to the Principality. Clicking on the flag (yes, it has its own flag, too) takes you to a page with a wealth of information including the principality’s history, profiles of important people like HRH Princess Shirley and the princes Ian, Wayne, Richard and Graeme, an economic profile, passport and citizenship instructions and even two royal colleges!

Apparently, the Hutt River Province Principality seceded from Australia in 1970, although this seems to be news to the Australian government which does not recognize the state. However, although this entire creation seems right in line with some other uniquely British (or British-inspired) eccentricities, the radio-related effort appears to be genuine.

Amateur Radio Newsline reports that Hutt River Director-General, Ministry of Electronic Communications, Eddie DeYoung, has announced plans to set up a shortwave broadcast station possibly to be called **Hutt River Radio**. DeYoung says the station’s programs will be primarily replays of old radio drama shows, music from yesteryear, readings from the world’s newspapers for print handicapped listeners, and that the station will provide timeslots to non-government humanitarian aid organizations.

DeYoung also says that the Hutt River Province is trying to gain United Nations recognition. In turn, this would enable the International Telecommunications Union to issue it with a block of radio callsigns. DeYoung adds that a written application has already been sent to the ITU seeking the H5 callsign block to be issued. DeYoung adds that a body to represent the interests of amateur radio has been formed, called the Royal Amateur Radio Society, and it is seeking membership of the International Amateur Radio Union for Region 3 and also for DXCC status.

DeYoung claims that according to the ARRL’s DXCC rules, Hutt River qualifies for separate country status because it meets the rule for sovereignty. He goes on to say that once Hutt River gains “New Country” status, it is anticipated that a large number of DXers and contesters will be eager to operate from it.

If all this indeed happens, I wonder what debates this will inspire within the NASWA (North American Shortwave Association) Country List Committee? As they say, stay tuned – and get that dipole aimed toward this additional land downunder!

You just can’t make this stuff up! Until October, good DX and good listening!

Table 1: DRM Broadcasts

DRM clearly has focused its early attention on northwestern Europe when one compares the schedule for that region to its broadcasts intended for North America and other regions. But as this month’s column explains, there are good reasons for this approach. How many of these will actually be heard in North America even occasionally?

Source: The DRM Official Website <http://www.drm.org> Schedules as of 7/13/05.

UTC	Days	kHz	Beam	Target	Power	Programme	Language	Site
0000-2400	daily	1008	ND	Prov. Hunan	4	Economic Ch.	Chinese	Chang Sha
0000-2400	daily	25775	ND	Rennes	0.1	TDF Radio	French	Rennes
0000-2400	daily	693	ND	Berlin	80	VoR (Simulcast)	various	Oranienburg
0000-2400	daily	729	ND	NE Germany	1	DLF	German	Putbus
0000-2400	irreg	855	ND	Berlin	10	DLR	German	Berlin-Britz
0000-2400	daily	1485	ND	SW Germany	0.3	SWR Das Ding	German	Kaiserslautern
0000-2400	daily	15896	ND	Erlangen	0.1	biteXpress	German	Erlangen
0000-2400	daily	26000	ND	Neumarkt	0.1	Campus Radio	German	Dillberg
0000-2400	daily	26012	ND	Nuernberg	0.1	Campus Radio	German	Nuernberg
0000-2400	daily	1386	ND	West Sussex	1p	Tests	English	Hickstead
0000-2400	daily	5990	ND	Europe	50	RTL DRM 2	French	Junglinster
0000-2400	daily	6095	ND	Europe	50	RTL Radio	German	Junglinster
0300-0330	Sun	1440	320	Europe	120	RTL Radio	German	Marnach
0300-0400	daily	11955	268	NE USA	70	BBCWS	English	Sackville
0400-2205	daily	6085	ND	Europe	50	BR-B5akt	German	Ismaning
0500-0700	daily	6175	50	Germany	30	RFI	French/German	Issoudun
0600-0757	daily	7325	123	Europe	40	RNW	Dutch	Flevo
0600-0900	daily	15780	240	Europe	35	VoR	English	Taldom
0600-1000	daily	5975	ND	Europe	200	DW	various	Wertachtal
0600-1200	daily	7265	ND	Europe	200	DW	various	Wertachtal
0700-0800	daily	6175	180	S Eu/N Af	30	RFI	French	Issoudun
0700-1000	daily	21675	300	Near East	90	DW	English	Trincornale
0700-1600	daily	1440	45	Europe	240	RTL Radio	German	Marnach
0705-0900	daily	7265	40	Europe	90	DW	various	Sines
0715-1630	daily	1611	ND	Europe	25	Vatican Radio	various	Santa Maria
0800-0900	daily	6175	330	Great Britain	30	RFI	French	Issoudun
0800-0900	daily	7240	123	Europe	40	RNW	Dutch	Flevo
0800-1459	daily	15440	40	Europe	90	DW	various	Sines
0900-1100	daily	7240	123	Europe	40	RNW	English	Flevo
0900-1159	daily	15545	40	Europe	90	DW	various	Sines
0900-1200	daily	15780	240	Europe	35	VoR	German	Taldom
0930-1300	daily	13620	310	Europe	120	Radio Kuwait	Arabic	Sulaibiyah
1000-1100	daily	6175	50	Germany	30	RFI	French/German	Issoudun
1000-1300	daily	6140	120	Europe	40	DW	various	Juelich
1000-1500	daily	7320	105	Europe	33	BBCWS	English	Rampisham
1100-1200	daily	7240	123	Europe	40	RNW	Dutch	Flevo
1200-1300	daily	7240	123	Europe	40	RNW	English	Flevo
1200-1359	daily	9655	300	Europe	200	DW	various	Wertachtal
1200-1555	daily	15265	40	Europe	90	DW	various	Sines
1300-1330	daily	7240	123	Europe	40	RCI	English	Flevo
1300-1400	daily	9480	240	Europe	35	VoR	Russian	Taldom
1315-1730	daily	9880	282	N Africa	120	Radio Kuwait	Arabic	Sulaibiyah
1330-1400	daily	7240	123	Europe	40	RNW	English	Flevo
1400-1415	daily	7240	123	Europe	40	Vatican Radio	German	Flevo
1400-1430	Fri	9770	95	Europe	35	RFI	English	Rampisham
1400-1430	Sat	9770	95	Europe	35	R.New Zealand Int	English	Rampisham
1400-1500	Sun	9565	95	Europe	35	BYU Radio	English	Rampisham
1400-1500	daily	9480	240	Europe	35	VoR	English	Taldom
1400-1559	daily	6180	ND	Europe	200	DW	various	Wertachtal
1400-1600	Sat	3955	ND	Europe	40	TDPradio	Dance Music	Juelich
1415-1656	daily	7240	123	Europe	40	RNW	Dutch	Flevo
1430-1500	Fri	9770	95	Europe	35	Radio Korea Int.	English	Rampisham
1430-1500	Sat	9770	95	Europe	35	Radio Australia	English	Rampisham
1500-1600	Fri	9770	95	Europe	35	Radio Taiwan Int.	English	Rampisham
1500-1600	daily	9480	240	Europe	35	VoR	German	Taldom
1500-1755	daily	13790	40	Europe	90	DW	various	Sines
1600-1000	daily	3995	ND	Europe	200	DW	German	Wertachtal
1600-1659	daily	7175	40	Europe	200	DW	various	Wertachtal
1600-1700	Sun	97052	95	Great Britain	50	Christian Voice	English	Moosbrunn
1600-1700	daily	6175	50	Germany	30	RFI	German	Issoudun
1600-1700	Fri	9770	95	Europe	35	NHK	English	Rampisham
1600-1700	Wed	9770	95	Europe	35	BYU Radio	English	Rampisham
1600-1700	daily	9480	240	Europe	35	VoR	French	Taldom
1600-1800	Sat	11900	240	NE USA	70	TDPradio	Dance Music	Sackville
1600-1900	daily	6140	120	Europe	40	DW	various	Juelich
1600-1915	daily	1296	96	Europe	70	BBCWS	English	Orfordness
1700-1730	daily	5955	ND	Europe	40	Radio Sweden	English	Flevo
1700-1759	daily	7265	40	Europe	200	DW	various	Wertachtal
1730-1800	daily	5955	ND	Europe	40	Radio Sweden	German	Flevo
1800-1830	Sat	11900	240	NE USA	70	NASB	English	Sackville
1800-1900	daily	15215	61	Russia	33	BBC	Russian	Rampisham
1800-1955	daily	15435	50	SE Europe	90	DW	various	Sines
1900-2300	daily	7515	260	Europe	40	DW	various	Taldom
1945-2030	daily	9800	268	NE USA	70	Vatican Radio	English	Sackville
2000-2057	daily	9480	123	Europe	40	RNW	Dutch	Flevo
2030-2100	daily	9800	268	NE USA	70	RNW	English	Sackville
2100-2200	daily	9800	268	NE USA	70	RCI	English	Sackville
2100-2200	daily	5980	40	Europe	90	DW	various	Sines
2106-2400	daily	1296	96	Europe	70	BBCWS	English	Orfordness
2200-0200	daily	11675	350	NE USA	120	Radio Kuwait	Arabic	Sulaibiyah
2200-2230	daily	9800	268	NE USA	70	DW	English	Sackville
2200-2250	daily	1611	ND	Europe	25	Vatican Radio	Italian	Santa Maria
2230-2300	daily	9800	268	NE USA	70	Radio Sweden	English	Sackville
2230-2330	daily	6175	225	Spain	30	RFI	French/Spanish	Issoudun
2300-0300	daily	1440	320	Europe	120	RTL Radio	German	Marnach
2300-2400	daily	9800	268	NE USA	70	BBCWS	English	Sackville

September ... and it's time to DX!

Thank goodness, September is here! Ready for a new DX season? If you're like me, you've been ready since mid July! Who hasn't grown tired of excessive summer static levels, which tries the patience of even the most persistent listener?

In case you haven't noticed, it's that time of the year when twilight and nighttime patterns have improved. Look for stations from Africa, Europe and South America to fade in earlier and show improved reception prior to 0000 UTC.

In the tropical bands, Indonesian and East Asian stations are heard beginning at twilight in the evenings and anytime from 1000-1500 UTC, depending on your location. Another favorite is the Indian subcontinent, audible by mid October or earlier. Don't forget the South American stations which begin to fade in around 0700 UTC, followed

by the Papua New Guinea stations by 0800 UTC.

If you're a medium wave DXer, conditions are improving for you, too! Fall and winter DX is the best time for logging those cross county signals. Doug Smith's *AM Bandscan* column will keep you up to date on the latest news.

Don't forget to enclose return postage with your reception reports. Your best source is Bill Plum's DX Stamp Service. No one beats his quick service and affordable prices. Send Bill a self-addressed-envelope for a price list at: 12 Glenn Rd., Flemington, NJ 08822-3322.

Listeners, the DX season has begun...and will improve as the months proceed. Now is the time to nab those stations on your station or country hit list. Keep us informed of what you are hearing and QSLing - in what hopefully will be your best DX season!

AMATEUR RADIO

Denmark OZ5ESB 10 meters SSB. Full color photo card. Received in two and a half years via ARRL bureau. (Larry Van Horn N5FPW, NC)

Dominican Republic PA3GIO/HI9 (IOTA NA-096) 15 meters SSB. Full data color photo card. Received in 448 days via ARRL bureau. (Van Horn NC)

Martinique FM5BH (IOTA NA-107) 80 and 40 meters SSB. Full data plain card. Received in 15 days for a SASE via QSL Manager W3HNK, Joseph L. Arcure Jr., P.O. Box 73, Edgemont, PA 19028. (Van Horn, NC)

San Marino T7OA 20 meters SSB. Full data color photo. Received in two years via ARRL bureau. (Van Horn, NC)

United Nations (Switzerland) 4U1ITU 20 meters SSB. Full data color card. Received in six months via ARRL bureau, plus verified via ARRL Logbook of the World (LOTW). (Van Horn, NC)

GREECE

Radio Fila (via Kavala) 7430 kHz. Full data ERT Prince of Lillies tourist scenery series card, plus ERT schedules, and tourist brochures. Received in 36 days for an English report. Station address: P.O. Box 60019, 15310 Aghia Paraskevi, Athens, Greece. (Edward Kusalik, Alberta, Canada) <http://www.ert.gr>

Voice of Greece, 15485 kHz. Full data ERT Prince of Lillies tourist scenery series card, plus schedule. Received in 33 days. Station address: ERT, 432, Messouhion Av., 15432 Aghia Parakevi, Athens, Greece. (Joe Wood, Greenback, TN)

MEDIUM WAVE

CHRB, 1140 kHz AM. Full data letter on Golden West Broadcasting, Ltd. letterhead, signed by Crystal Suitor-Office Administrator, plus station decal. Received in 15 days for AM report and mint stamps (used). Station address: 11 5th Ave., S.E., High River, Alberta, Canada T1V 1G2. (Bill Wilkins, Springfield, MO) <http://www.11040radio.com/>

KOAQ, 690 kHz AM. Partial data letter signed by Lois Penner-Traffic Manager. Received in six days for an AM report. Station address: 2002 Char Avenue, Scottsbluff, NE 69361. (Patrick Griffith, Westminster, CO)



KOKA, 1520 AM kHz. Full data QSL card signed by Dee Garrison-Renda, plus station souvenirs. Received in nine days for an AM report. Station address: 400 East Britton Rd., Oklahoma City, OK 73114-7507. (Patrick Martin, Seaside, OR)

KWOA, 730 kHz. Partial data note verifying reception, which was stuck to my original report, signed by Matt Widboom. Received in 13 days for an AM report. Station address: 28779 County Highway 35, Worthington, MN 56187. (Griffith, CO)

NEW ZEALAND

Radio NZ Int'l, 15720 kHz. Ultimate Experience post card stamped "verified," plus stickers, letter and program schedule. Received in 25 days for an English report and two US dollars. Station address: P.O. Box 123, Wellington, New Zealand. (Wood, TN)



RUSSIA

Russkoye Mezhdunarodnoye Radio (Russia Int'l Radio) 9555 kHz (via Jülich, Germany). Full data St. Peter and Paul Cathedral QSL card, plus Russian letter and Russian schedule. Received in 18 months following English follow up report. (Kusalik, CAN) 17705 kHz. Full data Summer Garden's Central Gate card, plus Russian letter. Received in 19 months. Station address: Pyatniskaya 25,

113326 Moscow, Russia. (Arnaldo Slaen, Buenos Aires, Argentina).

SOUTH AFRICA

Channel Africa, 17770 kHz. Verification letter signed by Kathy Otto, plus Sentech schedule. Received in 27 days for an English email report to; ottok@sentech.co.za. (Wood, TN)



Radio Okapi (via Meyerton) 11690 kHz. Full data Foundation Hironde QSL card with illegible signature. Received in 24 days direct from Switzerland. Station address: 3, Cross Street, CH 1018 Lausanne, Switzerland. (Kusalik, CAN) Sentech (via Meyerton). The following were received with two full data verification letters, signed by Kathy Otto. Confirmation included power, coordinates and transmitters. BBC 7120; Radio Okapi; 11690; TWR 9660; FEBC 12125. Verification address: Transmission Planning, Private Bag X06, Honeydew 2040 South Africa. (Kusalik, CAN) <http://www.radiookapi.net/> <http://www.sentech.co.za>

UNITED KINGDOM

United Nations Radio (via Skelton) Merlin Communications. Full data United Nations card with specific transmitter information. Received in nine months after follow-up report. Verification address: Merlin Communications, 20 Lincoln's Inn Field, London WC2A #ED United Kingdom. (Kusalik, CAN)

UTILITY

SVO Olympia Radio, 6507 kHz USB. Full data color sheet showing view of station, signed by G. Panagiotakis-Sub Manager. Received in 17 days for a utility report and two IRCs. Station address: 85 Patision Str., 104 34 Athens, Greece. (Wilkins, MO)

VATICAN CITY STATE

Vatican Radio, 7305 kHz. Full data Pope John Paul II card, plus sticker and station literature. Received in 36 days for an English report. Station address: Città del Vaticano, Vatican City State. (Dan Malloy, Everett, MA) <http://www.vaticanradio.org>



HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Standard Time) 5, 6, 7 or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each hour.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 7:30 pm Eastern, 6:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes	
s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly
occ:	occasional
DRM:	Digital Radio Mondiale

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions.

But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas	
af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
pa:	Pacific
sa:	South America
va:	various

MT MONITORING TEAM

Gayle Van Horn
Frequency Manager

gaylevanhorn@monitoringtimes.com

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Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo, *NASWA Flash Sheet*; *BCL News*; *Cumbre DX*; Glenn Hauser, *Enid, OK/DX Listening Digest*, Mike Kalez, Spokane, WA; Daniel Sampson/*Prime Time-SW*; *DX Window*; *Observer*, Bulgaria; ODXA/DX Ontario; Larry Van Horn N5FPW, MT Asst. Editor; *Hard Core DX*; *NASWA Journal*; WWDX.

Shortwave Broadcast Bands

kHz	Meters
2300-2495	120 meters (Note 1)
3200-3400	90 meters (Note 1)
3900-3950	75 meters (Regional band, used for broadcasting in Asia only)
3950-4000	75 meters (Regional band, used for broadcasting in Asia and Europe)
4750-4995	60 meters (Note 1)
5005-5060	60 meters (Note 1)
5730-5900	49 meter NIB (Note 2)
5900-5950	49 meter WARC-92 band (Note 3)
5950-6200	49 meters
6200-6295	49 meter NIB (Note 2)
6890-6990	41 meter NIB (Note 2)
7100-7300	41 meters (Regional band, not allocated for broadcasting in the western hemisphere) (Note 4)
7300-7350	41 meter WARC-92 band (Note 3)
7350-7600	41 meter NIB (Note 2)
9250-9400	31 meter NIB (Note 2)
9400-9500	31 meter WARC-92 band (Note 3)
9500-9900	31 meters
11500-11600	25 meter NIB (Note 2)
11600-11650	25 meter WARC-92 band (Note 3)
11650-12050	25 meters
12050-12100	25 meter WARC-92 band (Note 3)
12100-12600	25 meter NIB (Note 2)
13570-13600	22 meter WARC-92 band (Note 3)
13600-13800	22 meters
13800-13870	22 meter WARC-92 band (Note 3)
15030-15100	19 meter NIB (Note 2)
15100-15600	19 meters
15600-15800	19 meter WARC-92 band (Note 3)
17480-17550	17 meter WARC-92 band (Note 3)
17550-17900	17 meters
18900-19020	15 meter WARC-92 band (Note 3)
21450-21850	13 meters
25670-26100	11 meters

Notes

- Note 1 Tropical bands, 120/90/60 meters are for broadcast use only in designated tropical areas of the world.
- Note 2 Broadcasters can use this frequency range on a (NIB) non-interference basis only.
- Note 3 WARC-92 bands are allocated officially for use by HF broadcasting stations in 2007. They are only authorized on a non-interference basis until that date.
- Note 4 WRC-03 update. After March 29, 2009, the spectrum from 7100-7200 kHz will no longer be available for broadcast purposes and will be turned over to amateur radio operations worldwide

**GLENN HAUSER'S
WORLD OF RADIO**
<http://www.worldofradio.com>

For the latest DX and programming news, amateur nets, DX program schedules, audio archives and much more!



0000 UTC - 8PM EDT / 7PM CDT / 5PM PDT

0000	0015	vi	Cambodia, National Radio	11940as		
0000	0015		Japan, Radio 6145na	13650as	17810as	
			17825na			
0000	0027		Czech Rep, Radio Prague Intl	7345na	9440na	
0000	0030		Australia, Radio 9660as	12080as	13630pa	
			15240pa	17715as	17775pa	
0000	0030		Burma, Dem Voice of Burma	9435eu		
0000	0030		Egypt, Radio Cairo	11885na		
0000	0030	mtwhfa	Serbia & Montenegro, Intl Radio			
0000	0030		Thailand, Radio 9570va			
0000	0030		UK, BBC World Service	3915as	5970as	
			6195as 9410as	9740as	11945as	11955as
			15280as	15310as	15360as	17655as
			17790as			
0000	0030		USA, Voice of America	7215va	12140as	
			15185va	15290va		
0000	0045		India, All India Radio	9705as	9950as	11620as
			11645as	13605as		
0000	0057		Canada, Radio Canada Intl	9690as		
0000	0059		Spain, Radio Exterior Espana	15385na		
0000	0100		Anguilla, Caribbean Beacon	6090am		
0000	0100		Australia, ABC NT Alice Springs	2310irr	4835do	
0000	0100		Australia, ABC NT Katherine	5025do		
0000	0100		Australia, ABC NT Tennant Creek	4910do		
0000	0100		Australia, HCJB	15525as		
0000	0100		Canada, CFRX Toronto ON	6070do		
0000	0100		Canada, CFVP Calgary AB	6030do		
0000	0100		Canada, CKZN St John's NF	6160do		
0000	0100		Canada, CKZU Vancouver BC	6160do		
0000	0100		Canada, Radio Canada Intl	9755am	11990am	
			13710am			
0000	0100		China, China Radio Intl	6020na	7180as	
			9570na 13600eu			
0000	0100		Costa Rica, University Network	5030va	6150va	
			7375va 9725va			
0000	0100		Cuba, Radio Havana	12000na		
0000	0100		Germany, Deutsche Welle	7130as	9505as	
			9825as			
0000	0100		Guyana, Voice of	3290do		
0000	0100		Malaysia, Radio	7295as		
0000	0100	vi	Namibia, Namibian BC Corp	3270do	3290do	
			6060do 6175do			
0000	0100		Netherlands, Radio	9845na		
0000	0100		New Zealand, Radio NZ Intl	15720pa		
0000	0100	vi	Papua New Guinea, Wantok Radio Light		7120va	
0000	0100		Sierra Leone, Radio UNAMSIL	6137do		
0000	0100		Singapore, Mediacorp Radio	6150do		
0000	0100		UK, BBC World Service	5975am		
0000	0100		Ukraine, Radio Ukraine Intl	7440na		
0000	0100		USA, AFRTS	4319usb	5765usb	
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13855usb	
0000	0100		USA, KAJI Dallas TX	5755na		
0000	0100		USA, KTNB Salt Lake City UT	7505na	15590na	
0000	0100		USA, KWHR Naalehu HI	17510as		
0000	0100		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0000	0100		USA, WBOH Newport NC	5920am		
0000	0100		USA, WEWN Birmingham AL	5810va	7425va	
			13615va			
0000	0100		USA, WHRA Greenbush ME	7520na		
0000	0100	mtwhf	USA, WHRI Noblesville IN	7490am	9515am	
0000	0100	as	USA, WHRI Noblesville IN	7315am		
0000	0100		USA, WINB Red Lion PA	9320am		
0000	0100		USA, WJIE Louisville KY	13595am		
0000	0100		USA, WMLK Bethel PA 7385am			
0000	0100	twhfa	USA, WMLK Bethel PA 9955am			
0000	0100	sm	USA, WTJC Newport NC	9370na		
0000	0100		USA, WWCR Nashville TN	3210na	5070na	
			7465na 9985na	13845na		
0000	0100		USA, WWRB Manchester TN	3185na	5050na	
			5085na 5745na	6890na		
0000	0100		USA, WYFR Okeechobee FL	6065na	9505as	
			11835na	17805na		
0000	0100		Zambia, Christian Voice	4965af		
0030	0045	s	Germany, Pan American BC	9740as		
0030	0100		Australia, Radio 9660as	12080as	13630pa	
			15240pa	15415pa	17715as	17750pa
			17775as			
0030	0100	mtwhfs	Germany, Bible Voice Broadcasting	6010as		
0030	0100		Lithuania, Radio Vilnius	11690na		
0030	0100		Sri Lanka, SLBC	6005as	15745as	
0030	0100		Thailand, Radio	5890na		
0030	0100		UK, BBC World Service	5970as	6195as	
			9410as 9740as	11955as	15280as	15310as
			15360as	17790as		
0030	0100		USA, Voice of America	7215va	9780va	
			11760va	15185va	15290va	17740va
			17820va			
0035	0100	sm	Austria, Radio Austria Intl	9870sa		
0043	0058	twhfa	Austria, Radio Austria Intl	9870sa		
0045	0100		Pakistan, Radio	9340as	11565as	
0055	0100		Italy, RAI Intl	11800na		

0100 UTC - 9PM EDT / 8PM CDT / 6PM PDT

0100	0115		Italy, RAI Intl	11800na		
0100	0115		Pakistan, Radio	9340as	11565as	
0100	0127		Czech Rep, Radio Prague Intl	6200na	7345na	
0100	0128	s	Hungary, Radio Budapest	9560na		
0100	0128		Vietnam, Voice of	6175na		
0100	0129	s	Germany, Universal Life	9485as		
0100	0130	s	Australia, HCJB	15405as		
0100	0130		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	17715as	17750pa
			17775as			
0100	0130	mwfa	Belarus, Radio	5970eu	7210eu	
0100	0130	mtwhfa	Hungary, Radio Budapest	9590na		
0100	0130		Uzbekistan, Radio Tashkent	7190as	9715as	
0100	0156		Romania, Radio Romania Intl	6040na	9690na	
			11820na	15430na		
0100	0157		Netherlands, Radio	9845na		
0100	0159		Canada, Radio Canada Intl	9755am	11990am	
			13710am			
0100	0200		Anguilla, Caribbean Beacon	6090am		
0100	0200		Australia, ABC NT Katherine	5025do		
0100	0200		Australia, ABC NT Tennant Creek	4910do		
0100	0200		Australia, Voice Intl	7355as		
0100	0200		Canada, CFRX Toronto ON	6070do		
0100	0200		Canada, CFVP Calgary AB	6030do		
0100	0200		Canada, CKZN St John's NF	6160do		
0100	0200		Canada, CKZU Vancouver BC	6160do		
0100	0200		China, China Radio Intl	6005na	6020na	
			9570na 11870as	13640as		
0100	0200		Costa Rica, University Network	5030va	6150va	
			7375va 9725va			
0100	0200		Cuba, Radio Havana	6000na	9820na	12000na
0100	0200		Guyana, Voice of	3291do		
0100	0200		Indonesia, Voice of	9525as	11785pa	15150al
0100	0200		Japan, Radio	5960as	11860as	11935sa
			153235as	17560va	17685pa	17810as
			17825ca	17845as		
0100	0200		Malaysia, Radio	7295as		
0100	0200	vi	Namibia, Namibian BC Corp	3270do	3290do	
			6060do 6175do			
0100	0200		New Zealand, Radio NZ Intl	15720pa		
0100	0200		North Korea, Voice of	7140as	9345as	
			9730am	11735am	13760as	15180as
0100	0200	vi	Papua New Guinea, Wantok Radio Light		7120va	
0100	0200		Russia, Voice of	7180na	7250na	9665na
			15545na	15555na		
0100	0200		Sierra Leone, Radio UNAMSIL	6137do		
0100	0200		Singapore, Mediacorp Radio	6150do		
0100	0200		Sri Lanka, SLBC	6005as	15745as	
0100	0200		UK, BBC World Service	6195as	9410as	
			11955as	15280as	15310as	17790as
0100	0200		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13855usb	
0100	0200		USA, KAJI Dallas TX	5755na		
0100	0200		USA, KTNB Salt Lake City UT	7505na		
0100	0200		USA, KWHR Naalehu HI	17510as		
0100	0200		USA, Voice of America	7115va	9885va	
			11705va	11725va		
0100	0200		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0100	0200		USA, WBOH Newport NC	5920am		
0100	0200		USA, WEWN Birmingham AL	5810va	7425va	
			13615va			
0100	0200		USA, WHRA Greenbush ME	5850na		
0100	0200	mtwhf	USA, WHRI Noblesville IN	7490am	9515am	
0100	0200	as	USA, WHRI Noblesville IN	7315am		
0100	0200		USA, WINB Red Lion PA	9320am		
0100	0200		USA, WJIE Louisville KY	13595am		
0100	0200	twhfa	USA, WMLK Bethel PA 7385am			
0100	0200		USA, WTJC Newport NC	9370na		
0100	0200		USA, WWCR Nashville TN	3210na	5070na	
			5765na 13845na			
0100	0200		USA, WWRB Manchester TN	3185na	5050na	
			5085na 5745na	6890na		
0100	0200		USA, WYFR Okeechobee FL	6065na	9505as	
0100	0200		Zambia, Christian Voice	4965af		
0100	0200	sm	USA, WMLK Bethel PA 9955am			
0105	0130	sm	Austria, Radio Austria Intl	9870am		
0113	0130	twhfa	Austria, Radio Austria Intl	9870am		
0115	0130	a	Austria, Radio Austria Intl	9870sa		
0130	0200		Australia, HCJB	15405as		
0130	0200		Australia, Radio	9660as	12080as	13630pa
			15240pa	15415pa	17715as	17750pa
0130	0200	s	Belarus, Radio	5970eu	7210eu	
0130	0200		Iran, Voice of the Islamic Rep	9495am	11875am	
0130	0200		Sweden, Radio	6010na	9435va	
0130	0200	twhfa	USA, Voice of America	7405va	9775va	
			13740va			
0133	0200	sm	Austria, Radio Austria Intl	9870me		
0140	0200		Vatican City, Vatican Radio	9650as	12055as	
0143	0158	twhfa	Austria, Radio Austria Intl	9870na		
0145	0158	twhf	Albania, Radio Tirana	6115eu	7160eu	

Shortwave Guide

MT

0200 UTC - 10PM EDT / 9PM CDT / 7PM PDT

0200	0227	Iran, Voice of the Islamic Rep	9495am	11875am
0200	0230	Australia, HCJB 15405as		
0200	0230	Austria, AWR Europe 9895as		
0200	0230	mtwfa Belarus, Radio 5970eu	7210eu	
0200	0230	vl Croatia, Croatian Radio	9925sa	
0200	0300	Anguilla, Caribbean Beacon	6090am	
0200	0300	twhfa Argentina, RAE 11710am		
0200	0300	Australia, ABC NT Alice Springs	2310irr	4835do
0200	0300	Australia, ABC NT Katherine	5025do	
0200	0300	Australia, ABC NT Tennant Creek	4910do	
0200	0300	Australia, Radio 9660as	12080as	13630pa
		15240pa 15415pa	15515as	17750pa
		21725pa		
0200	0300	Australia, Voice Intl 7355as		
0200	0300	Bulgaria, Radio 9700na	11700na	
0200	0300	Canada, CFRX Toronto ON	6070do	
0200	0300	Canada, CFVP Calgary AB	6030do	
0200	0300	Canada, CKZN St John's NF	6160do	
0200	0300	Canada, CKZU Vancouver BC	6160do	
0200	0300	China, China Radio Intl	9580na	
0200	0300	Costa Rica, University Network	5030va	6150va
		7375va 9725va		
0200	0300	Cuba, Radio Havana 6000na	9820na	12000na
0200	0300	Egypt, Radio Cairo 7260na		
0200	0300	Guyana, Voice of 3291do		
0200	0300	Malaysia, Radio 7295as		
0200	0300	vl Namibia, Namibian BC Corp	3270do	3290do
		6060do 6175do		
0200	0300	New Zealand, Radio NZ Intl	15720pa	
0200	0300	North Korea, Voice of	4405as	13650as
		15100as		
0200	0300	vl Papua New Guinea, Wantok Radio Light	7120va	
0200	0300	Philippines, Radio Pilipinas	11885va	15270va
0200	0300	Russia, Voice of 5945me	7180na	9665na
		9860na 15545na 15555na	15595na	17660na
0200	0300	Sierra Leone, Radio UNAMSIL	6137do	
0200	0300	Singapore, Mediacorp Radio	6150do	
0200	0300	South Korea, Radio Korea Intl	9560va	11810sa
		15575va		
0200	0300	Sri Lanka, SLBC 6005as	11905as	15745as
0200	0300	Taiwan, Radio Taiwan Intl	5950na	9680na
		11875as 15465as		
0200	0300	UK, BBC World Service	5975am	9750af
		9825am 11760me	11955as	12095am
		15280as 15310as	15360as	17790as
0200	0300	USA, AFRTS 4319usb	5446usb	5765usb
		7590usb 7812usb	12133usb	12579usb
		12133usb	13362usb	13855usb
0200	0300	USA, KAJI Dallas TX 5755na		
0200	0300	USA, KJES Vado NM 7555na		
0200	0300	USA, KTBN Salt Lake City UT	7505na	
0200	0300	USA, KWHR Naalehu HI	17510as	
0200	0300	mtwhf USA, Voice of America	7115va	9885va
		11705va 11725va		
0200	0300	USA, WBCQ Kennebunk ME	5105na	7415na
		9330na		
0200	0300	USA, WBOH Newport NC	5920am	
0200	0300	USA, WEWN Birmingham AL	5810va	7425va
		13615va		
0200	0300	USA, WHRA Greenbush ME	5850na	
0200	0300	mtwhf USA, WHRI Noblesville IN	7490am	9515am
0200	0300	as USA, WHRI Noblesville IN	7315am	
0200	0300	USA, WINB Red Lion PA	9320am	
0200	0300	USA, WJIE Louisville KY	13595am	
0200	0300	twhfa USA, WMLK Bethel PA 7385am		
0200	0300	sm USA, WMLK Bethel PA 9955am		
0200	0300	USA, WTJC Newport NC	9370na	
0200	0300	USA, WWCR Nashville TN	3210na	5070na
		5765na 5935na		
0200	0300	USA, WWRB Manchester TN	3185na	5050na
		5085na 5745na 6890na		
0200	0300	USA, WYFR Okeechobee FL	5985na	6065na
		9505na 11835na 11855na		
0200	0300	Zambia, Christian Voice	4965af	
0215	0230	Nepal, Radio 3230as	5005as	6100as
		7165as		
0225	0235	Libya, Voice of Africa 7230af		
0230	0258	twhf Albania, Radio Tirana 6115eu	7160eu	
0230	0258	Hungary, Radio Budapest	9795na	
0230	0258	Vietnam, Voice of 6175na		
0230	0300	s Belarus, Radio 5970eu	7210eu	
0230	0300	Sweden, Radio 6010na		
0245	0300	Myanmar, Radio 9730do		
0250	0300	Vatican City, Vatican Radio	7305am	9605am
0256	0300	Turkey, Voice of 6140va	7270va	

0300 UTC - 11PM EDT / 10PM CDT / 8PM PDT

0300	0320	Vatican City, Vatican Radio	7305am	9605am
0300	0327	Czech Rep, Radio Prague Intl	7345na	9870na

0300	0330	Egypt, Radio Cairo 7260na		
0300	0330	Myanmar, Radio 9730do		
0300	0330	Philippines, Radio Pilipinas	11885va	15270va
0300	0330	Thailand, Radio 5890na		
0300	0330	USA, KJES Vado NM 7555na		
0300	0330	USA, Voice of America	4930af	6080af
		7290af 7340af 9885af	12080af	17895af
0300	0330	Vatican City, Vatican Radio	9660af	
0300	0350	Turkey, Voice of 6140va	7270va	
0300	0355	South Africa, Channel Africa	6150af	
0300	0400	Anguilla, Caribbean Beacon	6090am	
0300	0400	Australia, ABC NT Alice Springs	2310irr	4835do
0300	0400	Australia, ABC NT Katherine	5025do	
0300	0400	Australia, ABC NT Tennant Creek	4910do	
0300	0400	Australia, Radio 9660as	12080as	13630pa
		15240pa 15415pa	15515as	17750pa
		21725pa		
0300	0400	Australia, Voice Intl 13685as		
0300	0400	DRM Canada, BBC World Service	11955na	
0300	0400	twhf Canada, CBC NQ SW Service	9625na	
0300	0400	Canada, CFRX Toronto ON	6070do	
0300	0400	Canada, CFVP Calgary AB	6030do	
0300	0400	Canada, CKZN St John's NF	6160do	
0300	0400	Canada, CKZU Vancouver BC	6160do	
0300	0400	China, China Radio Intl	9690am	9790am
		11870as 15110as		
0300	0400	Costa Rica, University Network	5030va	6150va
		7375va 9725va		
0300	0400	Cuba, Radio Havana 6000na	9820na	
0300	0400	Guyana, Voice of 3291do		
0300	0400	Japan, Radio 21610pa		
0300	0400	Malaysia, Radio 7295as		
0300	0400	Malaysia, Voice of 6175as	9750as	15295as
0300	0400	vl Namibia, Namibian BC Corp	3270do	3290do
		6060do 6175do		
0300	0400	New Zealand, Radio NZ Intl	15720pa	
0300	0400	North Korea, Voice of	3560as	7140as
		9345as 9730as		
0300	0400	vl Papua New Guinea, Wantok Radio Light	7120va	
0300	0400	Russia, Voice of 5900na	7180na	9665na
		9860na 15545na 15555na	15595na	17660na
0300	0400	vl Rwanda, Radio 6055do		
0300	0400	Sierra Leone, Radio UNAMSIL	6137do	
0300	0400	Singapore, Mediacorp Radio	6150do	
0300	0400	South Africa, Channel Africa	3345af	
0300	0400	Sri Lanka, SLBC 6005as	11905as	15745as
0300	0400	Taiwan, Radio Taiwan Intl	5950na	15215va
		15320va		
0300	0400	vl Uganda, Radio 4976do	5026do	7196do
0300	0400	UK, BBC World Service	3255af	5975am
		6005af 6190af 6195eu	7160af	9410eu
		9750af 11760me 11760as	11765af	12035af
		12095as 15280as	15310as	15420af
		15575me 17760as	17790as	21660as
0300	0400	vl/ mtwhf UK, Sudan Radio Service	9625va	
0300	0400	Ukraine, Radio Ukraine Intl	7440na	
0300	0400	USA, AFRTS 4319usb	5446usb	5765usb
		7590usb 7812usb	12133usb	12579usb
		12133usb	13362usb	13855usb
0300	0400	USA, KAJI Dallas TX 5755na		
0300	0400	USA, KTBN Salt Lake City UT	7505na	
0300	0400	USA, KWHR Naalehu HI	17510as	
0300	0400	USA, WBCQ Kennebunk ME	5105na	7415na
		9330na		
0300	0400	USA, WBOH Newport NC	5920am	
0300	0400	USA, WEWN Birmingham AL	5810va	7425va
		13615va		
0300	0400	USA, WHRA Greenbush ME	5850na	
0300	0400	mtwhf USA, WHRI Noblesville IN	5835am	7465am
0300	0400	as USA, WHRI Noblesville IN	7315am	
0300	0400	USA, WINB Red Lion PA	9320am	
0300	0400	USA, WJIE Louisville KY	13595am	
0300	0400	USA, WMLK Bethel PA 7385am		
0300	0400	USA, WTJC Newport NC	9370na	
0300	0400	USA, WWCR Nashville TN	3210na	5070na
		5765na 5935na		
0300	0400	USA, WWRB Manchester TN	3185na	5050na
		5085na 5745na 6890na		
0300	0400	USA, WYFR Okeechobee FL	6065na	9505na
		11740na 15255na		
0300	0400	Zambia, Christian Voice	4965af	
0300	0400	vl Zimbabwe, ZBC Corp 5975do		
0300	0345	Hungary, Radio Budapest	6025eu	9655eu
0300	0345	Israel, Kol Israel 7545va	17600va	
0300	0357	Czech Rep, Radio Prague Intl	9445va	11600va
0300	0358	Vietnam, Voice of 6175am		
0300	0400	UAE, Emirates Radio 12005na	13675na	15400na
0300	0400	mtwhf USA, Voice of America	7290af	12080af
		17895af		
0330	0400	USA, Voice of America	4930af	6080af
		9885af		

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0500 UTC - 1AM EDT / 12AM CDT / 10PM PDT

0500	0520		Vatican City, Vatican Radio	4005eu	5885eu
0500	0530		7250eu Australia, Radio	9660as	12080as
0500	0530		15160pa	15240pa	15515va
0500	0530		France, Radio France Intl	9825af	15160af
0500	0530	vl	Rwanda, Radio	6055do	
0500	0530		UK, BBC World Service	6005af	6190af
			7160af 11765af	11940af	11955me
			12035af	12095va	15280as
			15420af	15575me	17760as
			21660as		
0500	0530		UK, BBC World Service	6005af	6195af
			7160af 9410va	11765af	11940af
			15280as	15310as	15360as
			17760as	17790as	17885af
0500	0530		Vatican City, Vatican Radio	9660af	
0500	0555		South Africa, Channel Africa	9685af	
0500	0600		Anguilla, Caribbean Beacon	6090am	
0500	0600		Australia, ABC NT Alice Springs	2310irr	4835do
0500	0600		Australia, ABC NT Katherine	5025do	
0500	0600		Australia, ABC NT Tennant Creek	4910do	
0500	0600		Australia, Voice Intl	13685as	
0500	0600	DRM	Austria, Virgin Radio	9720eu	
0500	0600		Canada, CFRX Toronto ON		6070do
0500	0600		Canada, CKZN St John's NF		6160do
0500	0600		Canada, CKZU Vancouver BC		6160do
0500	0600		China, China Radio Intl		6190na
			9590af 11710af	11880as	15350as
			17505af	17540as	
0500	0600		Costa Rica, University Network	5030va	6150va
			7375va 9725va		
0500	0600		Cuba, Radio Havana	6000va	6060va
			11760va		
0500	0600		Germany, Deutsche Welle	9630af	9700af
			15410af	17800af	
0500	0600		Guyana, Voice of	3291do	
0500	0600		Japan, Radio	5975eu	6110na
			15195as	17810as	21755pa
0500	0600		Malaysia, Radio	7295as	
0500	0600		Malaysia, Voice of	6175as	9750as
0500	0600	vl	Namibia, Namibian BC Corp	3270do	15295as
			6060do 6175do		3290do
0500	0600		New Zealand, Radio NZ Intl	11820pa	
0500	0600		Nigeria, Radio/Ibadan	6050do	
0500	0600		Nigeria, Radio/Kaduna	4770do	6090do
0500	0600		Nigeria, Radio/Lagos	3326do	
0500	0600		Nigeria, Voice of	15120af	
0500	0600	vl	Papua New Guinea, Wantok Radio Light		7120va
0500	0600		Russia, Voice of	17665pa	21790pa
0500	0600		Sierra Leone, Radio UNAMSIL	6137do	
0500	0600		Singapore, Mediacorp Radio	6150do	
0500	0600		South Africa, Channel Africa	7240af	
0500	0600		Swaziland, TWR	3200af	9500af
0500	0600	vl	Uganda, Radio	4976do	7196do
0500	0600		UK, BBC World Service	6195eu	11760me
			12095eu	15565eu	
0500	0600	vl/ mtwhf	UK, Sudan Radio Service	11795va	
0500	0600		USA, AFRTS	4319usb	5765usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13362usb
0500	0600		USA, KAIJ Dallas TX	5755na	
0500	0600		USA, KTVN Salt Lake City UT		7505na
0500	0600		USA, KWHR Naalehu HI	9510as	17510as
0500	0600		USA, Voice of America	4930af	6080af
			6180af 7290af	12080af	13645af
0500	0600		USA, WBCQ Kennebunk ME	7415na	
0500	0600		USA, WBOH Newport NC	5920am	
0500	0600		USA, WEWN Birmingham AL	5850va	7425va
0500	0600		USA, WHRA Greenbush ME	7490na	
0500	0600		USA, WHRI Noblesville IN	7315am	7465am
0500	0600		USA, WJIE Louisville KY	13595am	
0500	0600		USA, WMLK Bethel PA 9265eu	9955eu	
0500	0600		USA, WRMI Miami FL 7385am		
0500	0600		USA, WTJC Newport NC	9370na	
0500	0600		USA, WWCN Nashville TN	3210na	5070na
			5765na 5935na		
0500	0600		USA, WWRB Manchester TN	3185na	5050na
			5085na 5745na		
0500	0600		USA, WYFR Okeechobee FL	6855eu	9355eu
0500	0600		Zambia, Christian Voice	4965af	
0500	0600	vl	Zimbabwe, ZBC Corp	5975do	
0505	0520	m	Austria, Radio Austria Intl		17870me
0505	0530	as	Austria, Radio Austria Intl		17870me
0515	0600		Zambia, Christian Voice	9555af	
0525	0600	vl	Ghana, Ghana BC Corp	3366do	4915do
0530	0600		Australia, Radio	9660as	12080as
			15160pa	15240va	15415as
			17750as		15515pa
0530	0600		Thailand, Radio	17690va	
0530	0600		UK, BBC World Service	6005af	6190af
			7160af 9410af	11765af	11940af
			15310as	15360as	15420af
			17760as	17790as	17885af
0530	0600	mtwhf	UK, BBC World Service	17885af	
0545	0600	twh	Austria, Radio Austria Intl	17870me	
0545	0600	vl	Rwanda, Radio	6055do	

Shortwave Guide



0600 UTC - 2AM EDT / 1AM CDT / 11PM PDT

0600	0605	vi	Croatia, Croatian Radio	13820na	
0600	0615	as	South Africa, TWR	11640af	
0600	0630		France, Radio France Intl	11665af	15160af
			17800af		
0600	0645	mtwhf	South Africa, TWR	11640af	
0600	0655		South Africa, Channel Africa	15440af	
0600	0700		Anguilla, Caribbean Beacon	6090am	
0600	0700		Australia, ABC NT Alice Springs	2310irr	4835do
0600	0700		Australia, ABC NT Katherine	5025do	
0600	0700		Australia, ABC NT Tennant Creek	4910do	
0600	0700		Australia, Radio	9660as	13630as
			15160pa	15240va	15415as
			17750va		15515pa
0600	0700		Australia, Voice Intl	15335as	
0600	0700	DRM	Austria, Virgin Radio	9720eu	
0600	0700		Canada, CFRX Toronto ON	6070do	
0600	0700		Canada, CFVP Calgary AB	6030do	
0600	0700		Canada, CKZN St John's NF	6160do	
0600	0700		Canada, CKZU Vancouver BC	6160do	
0600	0700		China, China Radio Intl	9590af	11710af
			11870me	13620me	15350as
			15465as	17490eu	17505af
			Costa Rica, University Network	7375va	9725va
			11870va		6150va
0600	0700		Cuba, Radio Havana	6000va	6060va
			11760va		9550va
0600	0700		Germany, Deutsche Welle	6140eu	7170af
			15275af		
0600	0700	vi	Ghana, Ghana BC Corp	3366do	4915do
0600	0700		Guyana, Voice of	3291do	
0600	0700		Japan, Radio	7230eu	11715as
			11760as	13630va	11740as
			21755pa		15195as
0600	0700		Liberia, ELWA	4760do	
0600	0700		Malaysia, Radio	7295as	
0600	0700		Malaysia, Voice of	6175as	9750as
0600	0700	vi	Namibia, Namibian BC Corp	3270do	15295as
			6060do	6175do	3290do
0600	0700		New Zealand, Radio NZ Intl	11820pa	
0600	0700		Nigeria, Radio/Ibadan	6050do	
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do
0600	0700		Nigeria, Radio/Lagos	3326do	
0600	0700		Nigeria, Voice of	15120af	
0600	0700	vi	Papua New Guinea, Wantok Radio Light		7120va
0600	0700		Russia, Voice of	17665pa	
0600	0700	DRM	Russia, Voice of	15780eu	
0600	0700		Sierra Leone, Radio UNAMSIL	6137do	
0600	0700	irreg/ vi	Sierra Leone, SLBS	3316do	
0600	0700		Singapore, Mediacorp Radio	6150do	
0600	0700	vi	Solomon Islands, SIBC	5020do	9545do
0600	0700		South Africa, Channel Africa	7240af	
0600	0700		Swaziland, TWR	4775af	6120af
0600	0700		UK, BBC World Service	6190af	9500af
			9410va	11765as	7160af
			15310as	15360as	12095as
			15575me	17640af	15400af
			UK, BBC World Service	17790as	15565as
0600	0700	as	USA, AFRTS	4319usb	21660as
0600	0700		USA, AFRTS	7590usb	5446usb
			12133usb	7812usb	5765usb
			12133usb	12579usb	12133usb
			USA, KAU Dallas TX	5755na	13855usb
0600	0700		USA, KTN Salt Lake City UT	7505na	
0600	0700		USA, KWHR Naalehu HI	9510as	13700as
0600	0700		USA, Voice of America	6080af	7290af
			7290af	12080af	
0600	0700		USA, WBCQ Kennebunk ME	7415na	
0600	0700		USA, WBOH Newport NC	5920am	
0600	0700		USA, WEWN Birmingham AL	5850va	7425va
			7570va		
0600	0700		USA, WHRA Greenbush ME	7490na	
0600	0700		USA, WHRI Noblesville IN	7315am	7465am
0600	0700		USA, WJIE Louisville KY	13595am	
0600	0700		USA, WMLK Bethel PA 9265eu	9955eu	
0600	0700		USA, WRMI Miami FL 7385am		
0600	0700		USA, WTJC Newport NC	9370na	
0600	0700		USA, WWCR Nashville TN	3210na	5070na
			5765na	5935na	
0600	0700		USA, WWRB Manchester TN	3185na	
0600	0700		USA, WYFR Okeechobee FL	5810eu	7355eu
0600	0700	vi	Vanuatu, Radio	4960do	
0600	0700		Yemen, Rep of Yemen Radio	9780me	
0600	0700		Zambia, Christian Voice	9555af	
0600	0700	vi	Zimbabwe, ZBC Corp	5975do	
0630	0645		Vatican City, Vatican Radio	4005af	5885af
			7250af	9645eu	15595ca
0630	0656		Romania, Radio Romania Intl	9655eu	11830eu
0630	0700		Bulgaria, Radio	11600eu	
0630	0700	s	Germany, Bible Voice Broadcasting	5945eu	
0630	0700		Vatican City, Vatican Radio	11625af	13765ca
			15570va		
0645	0700	s	Albania, TWR	11865eu	
0645	0700	s	Monaco, TWR	9870eu	

0700 UTC - 3AM EDT / 2AM CDT / 12AM PDT

0700	0705		New Zealand, Radio NZ Intl	11820pa	
0700	0727		Czech Rep, Radio Prague Intl	9880eu	11600eu
0700	0730		UK, BBC World Service	11760me	15575me
0700	0800	mtwhf	Albania, TWR	11865eu	
0700	0800		Anguilla, Caribbean Beacon	6090am	
0700	0800		Australia, ABC NT Alice Springs	2310irr	4835do
0700	0800		Australia, ABC NT Katherine	5025do	
0700	0800		Australia, ABC NT Tennant Creek	4910do	
0700	0800		Australia, HCJB	11750au	
0700	0800		Australia, Radio	9660as	12080as
			15160pa	15240va	15415as
0700	0800		Australia, Voice Intl	15335as	
0700	0800	DRM	Austria, Virgin Radio	9720eu	
0700	0800		Canada, CFRX Toronto ON	6070do	
0700	0800		Canada, CFVP Calgary AB	6030do	
0700	0800		Canada, CKZN St John's NF	6160do	
0700	0800		Canada, CKZU Vancouver BC	6160do	
0700	0800		China, China Radio Intl	11880as	13710eu
			15350as	15465as	17490eu
0700	0800		Costa Rica, University Network	7375va	9725va
			11870va		6150va
0700	0800		Eqt Guinea, Radio Africa	15190af	
0700	0800		France, Radio France Intl	15605af	
0700	0800	as	Germany, Bible Voice Broadcasting	5945eu	
0700	0800		Germany, Deutsche Welle	6140eu	
0700	0800	vi	Ghana, Ghana BC Corp	3366do	4915do
0700	0800		Guyana, Voice of	3291do	
0700	0800	vi/as	Italy, IRRS 13840va		
0700	0800		Liberia, ELWA	4760do	
0700	0800		Liberia, Star Radio	9525af	
0700	0800		Malaysia, Radio	7295as	
0700	0800		Malaysia, Voice of	6175as	9750as
0700	0800	mtwhfa	Monaco, TWR	9870eu	15295as
0700	0800		Myanmar, Radio	9730do	
0700	0800	vi	Namibia, Namibian BC Corp	3270do	3290do
			6060do	6175do	
0700	0800		Nigeria, Radio/Ibadan	6050do	
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do
0700	0800		Nigeria, Radio/Lagos	3326do	
0700	0800	vi	Papua New Guinea, Wantok Radio Light		7120va
0700	0800		Russia, Voice of	17495pa	21790pa
0700	0800	DRM	Russia, Voice of	15780eu	
0700	0800		Sierra Leone, Radio UNAMSIL	6137do	
0700	0800	irreg/ vi	Sierra Leone, SLBS	3316do	
0700	0800		Singapore, Mediacorp Radio	6150do	
0700	0800	vi	Solomon Islands, SIBC	5020do	9545do
0700	0800		South Africa, Channel Africa	7240af	
0700	0800	DRM	Sri Lanka, Deutsche Welle	21675as	
0700	0800		Swaziland, TWR	4775af	6120af
0700	0800		Swaziland, TWR	4775af	6120af
0700	0800		Taiwan, Radio Taiwan Intl	5950na	9500af
0700	0800		UK, BBC World Service	6005af	6190af
			11940af	11765af	11955as
			15310as	15360as	12095af
			17760as	17790as	15400af
			USA, AFRTS	4319usb	15485af
			7590usb	7812usb	21660as
			12133usb	12579usb	5446usb
			USA, KAU Dallas TX	5755na	5765usb
0700	0800		USA, KTN Salt Lake City UT	7505na	
0700	0800		USA, KWHR Naalehu HI	9510as	13700as
0700	0800		USA, Voice of America	6080af	7290af
			13645af		
0700	0800		USA, WBOH Newport NC	5920am	
0700	0800		USA, WEWN Birmingham AL	5850va	7475va
			7570va		
0700	0800		USA, WHRI Noblesville IN	7315am	7465am
0700	0800		USA, WJIE Louisville KY	13595am	
0700	0800		USA, WMLK Bethel PA 9265eu	9955eu	
0700	0800		USA, WRMI Miami FL 7385am		
0700	0800		USA, WTJC Newport NC	9370na	
0700	0800		USA, WWCR Nashville TN	3210na	5070na
			5765na	5935na	
0700	0800		USA, WWRB Manchester TN	3185na	
0700	0800		USA, WYFR Okeechobee FL	5985va	6855va
			7355va	9505va	
0700	0800	vi	Vanuatu, Radio	4960do	
0700	0800		Zambia, Christian Voice	9555af	
0706	0800		New Zealand, Radio NZ Intl	9885pa	
0715	0750	a	Albania, TWR	11865eu	
0715	0750	a	Monaco, TWR	9870eu	
0730	0800		Georgia, Radio Georgia	11805eu	
0730	0800	as	Guam, TWR/KTWR	15255as	
0730	0800	as	UK, BBC World Service	15575me	17885af
0740	0800	mtwhf	Guam, TWR/KTWR	15225as	

0800 UTC - 4AM EDT / 3AM CDT / 1AM PDT

0800	0820	mtwhfs	Albania, TWR	11865eu	
0800	0820	s	Monaco, TWR	9870eu	

Shortwave Guide



0800	0830		Australia, ABC NT Katherine	5025do		
0800	0830		Australia, ABC NT Tennant Creek	4910do		
0800	0830		Australia, Radio	5995as	9580as	9590as
			9710as 12080pa	13630pa	15240pa	17750pa
0800	0830	as	Australia, Radio	15415va		
0800	0830		Liberia, ELWA	4760do		
0800	0830		Malaysia, Voice of	6175as	9750as	
0800	0830		Myanmar, Radio	9730do		
0800	0830		Swaziland, TWR	4775af	6120af	9500af
0800	0845	as	Germany, Bible Voice Broadcasting	5945eu		
0800	0900		Anguilla, Caribbean Beacon	6090am		
0800	0900		Australia, ABC NT Alice Springs	2310irr	4835do	
0800	0900		Australia, HCJB	11750au		
0800	0900		Australia, Voice Intl	15335as		
0800	0900	DRM	Austria, Virgin Radio	9720eu		
0800	0900		Canada, CFRX Toronto ON	6070do		
0800	0900		Canada, CFVP Calgary AB	6030do		
0800	0900		Canada, CKZN St John's NF	6160do		
0800	0900		Canada, CKZU Vancouver BC	6160do		
0800	0900		China, China Radio Intl	11880as	13710eu	
			15350as	15465as	17490eu	17540as
0800	0900		Costa Rica, University Network	5030va	6150va	
			7375va 9725va	11870va		
0800	0900		Eat Guinea, Radio Africa	15190af		
0800	0900		Germany, Deutsche Welle	6140eu		
0800	0900	vi	Ghana, Ghana BC Corp	3366do	4915do	
0800	0900	mtwhf	Guam, TWR/KTWR	11840as		
0800	0900		Guyana, Voice of	3291do		
0800	0900		Indonesia, Voice of	9525as		
0800	0900	vi/as	Italy, IRRS 13840va	15725al		
0800	0900		Liberia, Star Radio	9525af		
0800	0900		Malaysia, Radio	7295as		
0800	0900		Malaysia, Voice of	15295as		
0800	0900		New Zealand, Radio NZ Intl	9885pa		
0800	0900		Nigeria, Radio/Ibadan	6050do		
0800	0900		Nigeria, Radio/Kaduna	4770do	6090do	
0800	0900		Nigeria, Radio/Lagos	3326do	4990do	
0800	0900	vi	Pakistan, Radio	15100eu	15190eu	17835eu
0800	0900		Papua New Guinea, Catholic Radio	4960do		
0800	0900	vi	Papua New Guinea, NBC	4890do		
0800	0900		Papua New Guinea, Wantok Radio Light	7120va		
0800	0900	DRM	Russia, Voice of	17495pa	17635pa	21790pa
0800	0900		Russia, Voice of	15780eu		
0800	0900	irreg/ vi	Sierra Leone, Radio UNAMSIL	6137do		
0800	0900		Sierra Leone, SLBS	3316do		
0800	0900		Singapore, Mediacorp Radio	6150do		
0800	0900	vi	Solomon Islands, SIBC	5020do	9545do	
0800	0900	s	South Africa, Radio League	7205af	17565af	
0800	0900		South Korea, Radio Korea Intl	9570as	9640eu	
0800	0900	DRM	Sri Lanka, Deutsche Welle	21675as		
0800	0900		Taiwan, Radio Taiwan Intl	9610pa		
0800	0900		UK, BBC World Service	6190af	11760me	
			11940af	11955as	15310as	15360as
			15400af	15485af	15575me	17640eu
			17760as	17790as	17830af	17885af
			21470af	21660as		
0800	0900		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0800	0900		USA, KAIJ Dallas TX	5755na		
0800	0900		USA, KNLS Anchor Point AK	11870as		
0800	0900		USA, KTBN Salt Lake City UT	7505na		
0800	0900		USA, KWHR Naalehu HI	9510as	13700as	
0800	0900		USA, Voice of America	6080af	7290af	
			13645af			
0800	0900		USA, WBOH Newport NC	5920am		
0800	0900		USA, WEWN Birmingham AL	5850va	7425va	
			7570va			
0800	0900		USA, WHRI Noblesville IN	7315am	7520am	
0800	0900		USA, WJIE Louisville KY	13595am		
0800	0900		USA, WMLK Bethel PA 9265eu	9955eu		
0800	0900		USA, WRMI Miami FL 7385am			
0800	0900		USA, WTJC Newport NC	9370na		
0800	0900		USA, WWCR Nashville TN	3210na	5070na	
			5765na 5935na			
0800	0900	s	USA, WWRB Manchester TN	9320na		
0800	0900		USA, WWRB Manchester TN	3185na	5085na	
0800	0900		USA, WYFR Okeechobee FL	5950af	5985af	
			6855af 9930af			
0800	0900	vi	Vanuatu, Radio	4960do		
0800	0900		Zambia, Christian Voice	9555af		
0815	0900	as	Guam, TWR/KTWR	11840as		
0830	0900		Australia, ABC NT Katherine	2485do		
0830	0900		Australia, ABC NT Tennant Creek	2325do		
0830	0900		Australia, Radio	5995as	9580as	9590as
			9710as 12080pa	13630pa	15240pa	15415pa

0900 UTC - 5AM EDT / 4AM CDT / 2AM PDT

0900	0915	vi	Ghana, Ghana BC Corp	3366do	4915do	
0900	0927		Czech Rep, Radio Prague Intl	21745va		
0900	0930		Australia, Radio	9580as	9590as	15240as

0900	0930	as	Australia, Radio	15415va		
0900	0930		Guam, TWR/KTWR	11840as		
0900	1000		Anguilla, Caribbean Beacon	6090am		
0900	1000		Australia, ABC NT Alice Springs	2310do	4835irr	
0900	1000		Australia, ABC NT Katherine	2485do		
0900	1000		Australia, ABC NT Tennant Creek	2325do		
0900	1000		Australia, HCJB	11750au		
0900	1000		Australia, Voice Intl	11955as		
0900	1000	DRM	Austria, Asian Sound	11815eu		
0900	1000		Canada, CFRX Toronto ON	6070do		
0900	1000		Canada, CFVP Calgary AB	6030do		
0900	1000		Canada, CKZN St John's NF	6160do		
0900	1000		Canada, CKZU Vancouver BC	6160do		
0900	1000		China, China Radio Intl	15210pa	17490eu	
			17690pa			
0900	1000		Costa Rica, University Network	5030va	6150va	
			7375va 9725va	11870va		
0900	1000		Eat Guinea, Radio Africa	15190af		
0900	1000		Germany, Deutsche Welle	6140eu		
0900	1000		Guyana, Voice of	3291do		
0900	1000	vi/as	Italy, IRRS 13840va	15725al		
0900	1000		Malaysia, Radio	7295as		
0900	1000		Malaysia, Voice of	15295as		
0900	1000	vi	Namibia, Namibian BC Corp	3270do	3290do	
			6060do 6175do			
0900	1000	DRM	Netherlands, Radio	7240eu		
0900	1000		New Zealand, Radio NZ Intl	9885pa		
0900	1000		Nigeria, Radio/Ibadan	6050do		
0900	1000		Nigeria, Radio/Kaduna	4770do	6090do	
0900	1000		Nigeria, Radio/Lagos	3326do	4990do	
0900	1000	vi	Pakistan, Radio	15100eu	17835eu	
0900	1000		Papua New Guinea, Catholic Radio	4960do		
0900	1000		Papua New Guinea, NBC	4890do		
0900	1000	vi	Papua New Guinea, Wantok Radio Light	7120va		
0900	1000	vi	Rwanda, Radio	6055do		
0900	1000		Sierra Leone, Radio UNAMSIL	6137do		
0900	1000	irreg/ vi	Sierra Leone, SLBS	3316do		
0900	1000		Singapore, Mediacorp Radio	6150do		
0900	1000	vi	Solomon Islands, SIBC	5020do	9545do	
0900	1000	DRM	Sri Lanka, Deutsche Welle	21675as		
0900	1000		UK, BBC World Service	6190af	6195va	
			9605as 9740as	11760me	11940af	15310as
			15360as	15400af	15485af	15575me
			17640eu	17760as	17790as	17830af
			17885af	21470af	21660as	
0900	1000		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
0900	1000		USA, KAIJ Dallas TX	5755na		
0900	1000		USA, KTBN Salt Lake City UT	7505na		
0900	1000		USA, KWHR Naalehu HI	9510as	9930as	
0900	1000		USA, Voice of America	9520va	15205va	
			17745va			
0900	1000		USA, WBOH Newport NC	5920am		
0900	1000		USA, WEWN Birmingham AL	5850na	7425na	
0900	1000		USA, WHRI Noblesville IN	7520am	9495am	
0900	1000		USA, WJIE Louisville KY	7490am	13595am	
0900	1000		USA, WRMI Miami FL 9955am			
0900	1000		USA, WTJC Newport NC	9370na		
0900	1000		USA, WWCR Nashville TN	5070na	5765na	
			5935na 9985na			
0900	1000	s	USA, WWRB Manchester TN	9320na		
0900	1000		USA, WWRB Manchester TN	3185na	5085na	
0900	1000		USA, WYFR Okeechobee FL	5985af	6855af	
			9755af			
0900	1000	vi	Vanuatu, Radio	4960do		
0900	1000		Zambia, Christian Voice	9555af		
0905	1000	vi/s	Greece, Voice of	9420eu	11645eu	15630eu
			15650eu	21530eu		
0930	0945		Israel, Kol Israel	15640va		
0930	1000		Australia, Radio	9580as	9590as	15240as
			15415pa			
0930	1000	s	UAE, Radio UNMEE	21460af		
0930	1000		Vatican City, Vatican Radio	5885eu		

1000 UTC - 6AM EDT / 5AM CDT / 3AM PDT

1000	1030		Australia, Voice Intl	13685as		
1000	1030		Guam, AWR/KSDA	11930as		
1000	1030		Mongolia, Voice of	12085as		
1000	1057		Netherlands, Radio	7315va	9790va	12065va
			13820va			
1000	1059		New Zealand, Radio NZ Intl	9885pa		
1000	1100		Anguilla, Caribbean Beacon	11775am		
1000	1100		Australia, ABC NT Alice Springs	2310do	4835irr	
1000	1100		Australia, ABC NT Katherine	2485do		
1000	1100		Australia, ABC NT Tennant Creek	2325do		
1000	1100		Australia, HCJB	15405as		
1000	1100		Australia, Radio	9580as	9590as	15240as
			15415pa			
1000	1100	DRM	Austria, Asian Sound	11815eu		
1000	1100		Canada, CFRX Toronto ON	6070do		
1000	1100		Canada, CFVP Calgary AB	6030do		

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1000	1100		Canada, CKZN St John's NF	6160do		
1000	1100		Canada, CKZU Vancouver BC	6160do		
1000	1100		China, China Radio Intl	15210pa	17490eu	
			17690pa			
1000	1100		Costa Rica, University Network	5030va	6150va	
			7375va 9725va	11870va	13750va	
1000	1100	DRM	Germany, Deutsche Welle	6140eu		
1000	1100		Guyana, Voice of	3291do	5950do	
1000	1100		India, All India Radio	13695as	15020as	15410as
			17800as	17895as		
1000	1100	vl/as	Italy, IRRS 13840va	15725af		
1000	1100		Japan, Radio	6120na	9695as	11730as
			17585eu	17720va	21755pa	
1000	1100		Malaysia, Radio	7295as		
1000	1100		Malaysia, Voice of	15295as		
1000	1100	DRM	Netherlands, Radio	7240eu		
1000	1100		Nigeria, Voice of	15120af		
1000	1100		North Korea, Voice of	11735as	3560as	11710as
			13650ca	15180ca		
1000	1100		Papua New Guinea, Catholic Radio		4960do	
1000	1100		Papua New Guinea, NBC	4890do		
1000	1100	vl	Papua New Guinea, Wantok Radio Light		7120va	
1000	1100		Singapore, Mediacorp Radio	6150do		
1000	1100	vl	Solomon Islands, SIBC	5020do	9545do	
1000	1100		South Africa, Channel Africa	11825af		
1000	1100	DRM	UK, BBC World Service	7320eu		
1000	1100		UK, BBC World Service	6190af	6195va	
			9605as 11760me	11940af	15310as	15360as
			15485af	15575me	17640eu	17640me
			17760as	17790as	17885af	21470af
			21660as			
1000	1100	as	UK, BBC World Service	15400af	17830af	
1000	1100		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1000	1100		USA, KAJI Dallas TX	5755na		
1000	1100		USA, KNLS Anchor Point AK	9795as		
1000	1100		USA, KTVN Salt Lake City UT	7505na		
1000	1100		USA, KWHR Naalehu HI	9930as		
1000	1100		USA, Voice of America	9705va	15205va	
			17745va			
1000	1100		USA, WBOH Newport NC	5920am		
1000	1100		USA, WEWN Birmingham AL	5745na	7425na	
1000	1100		USA, WHRI Noblesville IN	7520am	9495am	
1000	1100		USA, WINB Red Lion PA	9320am		
1000	1100		USA, WJIE Louisville KY	7490am		
1000	1100		USA, WRMI Miami FL 9955am			
1000	1100		USA, WTJC Newport NC	9370na		
1000	1100		USA, WWCR Nashville TN	5070na	5765na	
			5935na 15825na			
1000	1100	s	USA, WWRB Manchester TN	9320na		
1000	1100		USA, WWRB Manchester TN	3185na	5085na	
1000	1100		USA, WYFR Okeechobee FL	5950na	5985na	
			6855na 9755na			
1000	1100		Zambia, Christian Voice	9555af		
1030	1045	mtwhf	Ethiopia, Radio	5990af	9704af	
1030	1057		Czech Rep, Radio Prague Intl	9880eu	11615eu	
1030	1058		Vietnam, Voice of	7285as		
1030	1100		Iran, Voice of the Islamic Rep	15660as	17660as	

1100 UTC - 7AM EDT / 6AM CDT / 4AM PDT

1100	1104	vl	Pakistan, Radio	15100eu	15190eu	17835eu
1100	1127		Iran, Voice of the Islamic Rep	15660as	17660as	
1100	1128		Vietnam, Voice of	9840as	7220as	7285as
1100	1130		Australia, HCJB	15405as		
1100	1130		Australia, Radio	5995as	6020as	9475as
			9560as 9580as	9590as	12080as	15240pa
1100	1130		UK, BBC World Service	6190af	11940af	17885af
			15400af	15485af	17830af	
			21470af			
1100	1157		Netherlands, Radio	11675na		
1100	1159	a	Germany, Universal Life		6055me	
1100	1200		Anguilla, Caribbean Beacon		11775am	
1100	1200		Australia, ABC NT Alice Springs	2310do		4835irr
1100	1200		Australia, ABC NT Katherine	2485do		
1100	1200		Australia, ABC NT Tennant Creek	2325do		
1100	1200		Australia, Voice Intl	13685as		
1100	1200	DRM	Austria, Asian Sound	11815eu		
1100	1200	as	Canada, CBC NQ SW Service		9625na	
1100	1200		Canada, CFRX Toronto ON	6070do		
1100	1200		Canada, CFVP Calgary AB	6030do		
1100	1200		Canada, CKZN St John's NF	6160do		
1100	1200		Canada, CKZU Vancouver BC	6160do		
1100	1200		China, China Radio Intl	17490eu	11750na	13650eu
1100	1200		Costa Rica, University Network	5030va	6150va	
			7375va 9725va	11870va	13750va	
1100	1200		Ecuador, HCJB	12005am	21455am	
1100	1200	DRM	Germany, Deutsche Welle	6140eu		
1100	1200		Germany, Overcomer Ministries	6110eu		
1100	1200	vl/as	Italy, IRRS 13840va	15725af		
1100	1200	vl	Italy, IRRS 13840va	15725af		

1100	1200		Japan, Radio	6120na	9695as	11730as
1100	1200		Malaysia, Radio	7295as		
1100	1200		Malaysia, Voice of	15295as		
1100	1200		New Zealand, Radio NZ Intl		9885pa	
1100	1200		Nigeria, Voice of	15120af		
1100	1200		Papua New Guinea, Catholic Radio			4960do
1100	1200		Papua New Guinea, NBC		4890do	
1100	1200	vl	Papua New Guinea, Wantok Radio Light			7120va
1100	1200		Singapore, Radio Singapore Intl		6080as	6150as
1100	1200		South Africa, Channel Africa		11825af	
1100	1200		Taiwan, Radio Taiwan Intl		7445as	
1100	1200	DRM	UK, BBC World Service		7320eu	
1100	1200		UK, BBC World Service		6195as	9740as
			11760me	11865am	15310as	15575me
			17640va	17760as	17790as	
1100	1200		Ukraine, Radio Ukraine Intl		15675eu	
1100	1200		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1100	1200		USA, KAJI Dallas TX	5755na		
1100	1200		USA, KTVN Salt Lake City UT		7505na	
1100	1200		USA, KWHR Naalehu HI		11555as	
1100	1200		USA, Voice of America		9705va	15205va
			17745va			
1100	1200		USA, WBOH Newport NC		5920am	
1100	1200		USA, WEWN Birmingham AL		5745na	11530na
			13615na			
1100	1200		USA, WHRI Noblesville IN		7520am	9495am
1100	1200		USA, WINB Red Lion PA		9320am	
1100	1200		USA, WJIE Louisville KY		7490am	
1100	1200		USA, WRMI Miami FL 9955am			
1100	1200		USA, WTJC Newport NC		9370na	
1100	1200		USA, WWCR Nashville TN		5070na	5935na
			7465na 15825na			
1100	1200	s	USA, WWRB Manchester TN		9320na	
1100	1200		USA, WWRB Manchester TN		3185na	5085na
1100	1200		USA, WYFR Okeechobee FL		5950va	5985va
			7355va 9550va	9625va	9755va	
1125	1200		Zambia, Christian Voice		9555af	
1130	1159	a	Vatican City, Vatican Radio		15595me	
1130	1200	as	Germany, Universal Life		6055me	
1130	1200		Australia, HCJB		15405as	
1130	1200		Australia, Radio		5995as	6020as
			9560as 9580as	9590as	12080as	15700eu
1130	1200		Bulgaria, Radio		11700eu	
1130	1200	t	UAE, Radio UNMEE		21550af	
1130	1200		UK, BBC World Service		6190af	11940af
			15485af	17830af	17885af	21470af
1130	1200		Vatican City, Vatican Radio		17515me	
1145	1200	vl	Libya, Voice of Africa		21675af	21695af

1200 UTC - 8AM EDT / 7AM CDT / 5AM PDT

1200	1215	vl	Cambodia, National Radio		11940as	
1200	1230	as	Australia, HCJB		15405as	
1200	1230		France, Radio France Intl		17815af	21620af
1200	1230		Malaysia, Voice of		15295as	
1200	1230		UAE, AWR Africa		15135as	
1200	1230		Uzbekistan, Radio Tashkent		7285as	15295as
			17775as			
1200	1259		Canada, Radio Canada Intl		9660as	15170as
1200	1259		New Zealand, Radio NZ Intl		9885pa	
1200	1259		Poland, Radio Polonia		9525eu	
1200	1300		Anguilla, Caribbean Beacon		11775am	
1200	1300		Australia, ABC NT Alice Springs		2310do	4835irr
1200	1300		Australia, ABC NT Katherine		2485do	
1200	1300		Australia, ABC NT Tennant Creek		2325do	
1200	1300		Australia, Radio		5995as	6020as
			9560as 9580as	9590as		
1200	1300		Australia, Voice Intl		13685as	
1200	1300	DRM	Austria, Classic Gold		11815eu	
1200	1300	as	Canada, CBC NQ SW Service		9625na	
1200	1300		Canada, CFRX Toronto ON		6070do	
1200	1300		Canada, CFVP Calgary AB		6030do	
1200	1300		Canada, CKZN St John's NF		6160do	
1200	1300		Canada, CKZU Vancouver BC		6160do	
1200	1300	mtwhf	Canada, Radio Canada Intl		9515am	13655am
			17800am			
1200	1300		China, China Radio Intl		9730as	9760pa
			11760pa	11980as	13650eu	13790eu
			17490eu			
1200	1300		Costa Rica, University Network		9725va	11870va
			13750va			
1200	1300	vl/a	Ecuador, HCJB		12005am	21455am
1200	1300		Italy, IRRS 15725va			
1200	1300		Malaysia, Radio		7295as	
1200	1300	DRM	Netherlands, Radio		7240na	
1200	1300		Nigeria, Voice of		15120af	
1200	1300		Papua New Guinea, Catholic Radio			4960do
1200	1300		Papua New Guinea, NBC		4890do	
1200	1300	vl	Papua New Guinea, Wantok Radio Light			7120va
1200	1300		Singapore, Radio Singapore Intl		6080as	6150as
1200	1300		South Korea, Radio Korea Intl		9650va	

Shortwave Guide



1200	1300		Taiwan, Radio Taiwan Intl	7130as	
1200	1300	DRM	UK, BBC World Service	7320eu	
1200	1300		UK, BBC World Service	6190af	9605am
			11760me	11865am	15190am
			15485af	15565eu	15575me
			17640me	17830me	17885af
1200	1300		USA, AFRTS	4319usb	5446usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13362usb
1200	1300		USA, KAIJ Dallas TX	5755na	
1200	1300		USA, KNLS Anchor Point AK	9615as	
1200	1300		USA, KTNB Salt Lake City UT	7505na	
1200	1300		USA, KWHR Naalehu HI	11555as	
1200	1300		USA, Voice of America	6160va	9645va
			9760va	15240va	
1200	1300		USA, WBCQ Kennebunk ME	17495na	
1200	1300		USA, WBOH Newport NC	5920am	
1200	1300		USA, WEWN Birmingham AL	5745na	11530na
			13615na		
1200	1300		USA, WHRA Greenbush ME	15310na	
1200	1300	as	USA, WHRI Noblesville IN	9840am	11785am
1200	1300		USA, WINB Red Lion PA	9320am	
1200	1300		USA, WJIE Louisville KY	7490am	
1200	1300		USA, WRMI Miami FL	7385am	
1200	1300		USA, WTJC Newport NC	9370na	
1200	1300		USA, WWCR Nashville TN	7465na	13845na
			9985na	15825na	
1200	1300	s	USA, WWRB Manchester TN	9320na	
1200	1300		USA, WYFR Okeechobee FL	5950na	5985na
			17505na	17750na	
1200	1300		Zambia, Christian Voice	9555af	
1205	1220	m	Austria, Radio Austria Intl	6155va	13730va
			17715va		
1215	1230	twhf	Austria, Radio Austria Intl	17715va	
1215	1300		Egypt, Radio Cairo	17835as	
1230	1245	h	Germany, Bible Voice Broadcasting	12065as	
1230	1245	mtwhf	Guam, TWR/KTWR	11750as	
1230	1258		Vietnam, Voice of	9840as	12020as
1230	1300		Australia, HCJB	15405as	
1230	1300		Bangladesh, Bangla Betar	7185as	
1230	1300	s	Germany, Bible Voice Broadcasting	5890as	
1230	1300		Sweden, Radio	13580va	15240na
1230	1300		Thailand, Radio	9600va	
1230	1300		Turkey, Voice of	15525eu	15535va
1235	1300	as	Austria, Radio Austria Intl	17715va	
1245	1300	twhf	Austria, Radio Austria Intl	6155eu	13730eu
			17715va		

1300 UTC - 9AM EDT / 8AM CDT / 6AM PDT

1300	1315	s	Germany, Bible Voice Broadcasting	5890eu	
1300	1327		Czech Rep, Radio Prague Intl	13580eu	21745af
1300	1329		Canada, Radio Canada Intl	9660as	15170as
1300	1330	DRM	Canada, Radio Canada Intl	7240eu	
1300	1330		Ecuador, HCJB	12005am	21455am
1300	1330		Egypt, Radio Cairo	17835as	
1300	1335		Turkey, Voice of	15225eu	15535va
1300	1356		Romania, Radio Romania Intl	11830eu	15105eu
1300	1357	DRM	China, China Radio Intl	7250va	11810va
1300	1400		Anguilla, Caribbean Beacon	11775am	
1300	1400		Australia, Radio	5995as	6020as
			9580pa	9590pa	9560pa
1300	1400		Australia, Voice Intl	13685as	
1300	1400	DRM	Austria, Premiur	11815eu	
1300	1400	as	Canada, CBC NQ SW Service	9625na	
1300	1400		Canada, CFRX Toronto ON	6070do	
1300	1400		Canada, CFVP Calgary AB	6030do	
1300	1400		Canada, CKZN St John's NF	6160do	
1300	1400		Canada, CKZU Vancouver BC	6160do	
1300	1400	as	Canada, Radio Canada Intl	9515am	13655am
			17800am		
1300	1400		China, China Radio Intl	9650am	11760pa
			11900pa	11980as	13790eu
			17490eu	17625ca	
1300	1400		Costa Rica, University Network	9725va	11870va
			13750va		
1300	1400		Germany, Deutsche Welle	6140eu	
1300	1400	vl/a	Italy, IRRS 15725va		
1300	1400		Jordan, Radio	11690na	
1300	1400		Malaysia, Radio	7295as	
1300	1400	DRM	Netherlands, Radio	7240eu	
1300	1400		New Zealand, Radio NZ Intl	6095pa	
1300	1400		Nigeria, Voice of	15120af	
1300	1400		North Korea, Voice of	4405eu	9335eu
			11710na	13760na	15245eu
1300	1400		Papua New Guinea, Catholic Radio		4960do
1300	1400		Papua New Guinea, NBC	4890do	
1300	1400	vl	Papua New Guinea, Wantok Radio Light	7120va	
1300	1400		Singapore, Radio Singapore Intl	6080as	6150as
1300	1400		South Korea, Radio Korea Intl	9570as	9770as
1300	1400	DRM	UK, BBC World Service	7320eu	
1300	1400		UK, BBC World Service	6190af	6195as
			9740as	11760me	11940af
				15190am	15310as

1300	1400		15420af	15485af	15565va	15575me
			17640va	17760as	17790as	17830af
			17885af	21470af		
1300	1400		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
1300	1400		USA, KAIJ Dallas TX	5755na		
1300	1400		USA, KTNB Salt Lake City UT		7505na	
1300	1400		USA, KWHR Naalehu HI		11555as	
1300	1400		USA, Voice of America		9645va	9760va
1300	1400		USA, WBCQ Kennebunk ME		17495na	
1300	1400		USA, WBOH Newport NC		5920am	
1300	1400		USA, WEWN Birmingham AL		5745na	11530na
			13615na			
1300	1400		USA, WHRA Greenbush ME		15310na	
1300	1400	mtwhf	USA, WHRI Noblesville IN		15285am	
1300	1400		USA, WINB Red Lion PA		13570am	
1300	1400		USA, WJIE Louisville KY		7490am	
1300	1400		USA, WRMI Miami FL	7385am		
1300	1400		USA, WTJC Newport NC		9370na	
1300	1400		USA, WWCR Nashville TN		7465na	13845na
			9985na	15825na		
1300	1400		USA, WYFR Okeechobee FL		11830va	11865va
			11910va	17750va		
1300	1400		Zambia, Christian Voice		9555af	
1330	1400	as	Australia, HCJB	15405as		
1330	1400	irreg	Cuba, Radio Havana	9550va	12000va	13680va
1330	1400		Guam, AWR/KSDA	11980as		
1330	1400	mwhta	Guam, AWR/KSDA	15275as		
1330	1400		India, All India Radio	9690as	11620as	13710as
1330	1400		Laos, National Radio	7145as		
1330	1400		Sweden, Radio	15240na	15735va	
1330	1400		Uzbekistan, Radio Tashkent	17775as	7285as	15295as

1400 UTC - 10AM EDT / 9AM CDT / 7AM PDT

1400	1415	h	Germany, Bible Voice Broadcasting	7485as	
1400	1415		Russia, FEBA	9500as	
1400	1430		Australia, Radio	5995as	6080as
			9590as	9625pa	7240as
1400	1430	mtwhf	Germany, Deutsche Welle		15725na
1400	1430		Oman, Radio Oman	15140as	
1400	1430		Thailand, Radio	9830va	
1400	1430	DRM/f	UK, Radio France Intl	9770eu	
1400	1430	DRM/a	UK, Radio NZ Intl	9770eu	
1400	1445	a	Germany, Pan American BC		15650me
1400	1459	as	Canada, Radio Canada Intl		9515am
			17800am		13655am
1400	1500		Anguilla, Caribbean Beacon		11775am
1400	1500		Australia, Voice Intl	15205as	
1400	1500	as	Canada, CBC NQ SW Service	9625na	
1400	1500		Canada, CFRX Toronto ON	6070do	
1400	1500		Canada, CFVP Calgary AB	6030do	
1400	1500		Canada, CKZN St John's NF	6160do	
1400	1500		Canada, CKZU Vancouver BC	6160do	
1400	1500		China, China Radio Intl	9590as	11675as
			11765as	11775as	13685af
			13790eu	17630af	17650eu
1400	1500	DRM	China, China Radio Intl	9610va	
1400	1500		Costa Rica, University Network	9725va	11870va
			13750va		
1400	1500		France, Radio France Intl	9580va	15615va
1400	1500	as	Germany, Bible Voice Broadcasting	7485as	
1400	1500		Germany, Deutsche Welle	6140eu	
1400	1500		Germany, Overcomer Ministries	6110eu	
1400	1500	vl/a	Greece, Voice of	9375eu	9420eu
			12105eu	15630eu	15650eu
1400	1500		India, All India Radio	9690as	11620as
1400	1500	vl/a	Italy, IRRS 15725va		13710as
1400	1500		Japan, Radio	7200as	11730as
1400	1500		Jordan, Radio	11690na	11840pa
1400	1500		Malaysia, Radio	7295as	
1400	1500		Netherlands, Radio	9345va	9890va
1400	1500		New Zealand, Radio NZ Intl		11835va
1400	1500		Nigeria, Voice of	15120af	6095pa
1400	1500	vl	Papua New Guinea, Wantok Radio Light		7120va
1400	1500	DRM	Russia, Voice of	9480eu	
1400	1500		Russia, Voice of	6205as	7390as
			11755as	15605as	17645as
1400	1500		Singapore, Mediacorp Radio	6150do	
1400	1500		South Africa, Channel Africa	11825af	
1400	1500		Taiwan, Radio Taiwan Intl	15265as	
1400	1500	DRM	UK, BBC World Service	7320eu	
1400	1500		UK, BBC World Service	6190af	6195as
			7105as	9740as	11760me
			15485af		15565va
			17830af	21470af	21660af
1400	1500		USA, AFRTS	4319usb	5446usb
			7590usb	7812usb	12133usb
			12133usb	12579usb	13362usb
1400	1500		USA, KAIJ Dallas TX	13815na	
1400	1500		USA, KJES Vado NM	11715na	

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1400	1500		USA, KNLS Anchor Point AK	9555as	
1400	1500		USA, KTBN Salt Lake City UT	7505na	15590na
1400	1500		USA, KWHR Naalehu HI	11555as	
1400	1500		USA, Voice of America	6160va	7125va
			9760va 15265va		
1400	1500		USA, WBCQ Kennebunk ME	17495na	
1400	1500		USA, WBOH Newport NC	5920am	
1400	1500		USA, WEWN Birmingham AL	9955na	11530na
			15745na		
1400	1500		USA, WHRA Greenbush ME	15310na	
1400	1500		USA, WHRI Noblesville IN	9840am	15285am
1400	1500		USA, WINB Red Lion PA	13570am	
1400	1500		USA, WJIE Louisville KY	7490am	
1400	1500		USA, WRMI Miami FL 7385am		
1400	1500		USA, WTJC Newport NC	9370na	
1400	1500		USA, WWCR Nashville TN	9985na	12160na
			13845na 15825na		
1400	1500		USA, WYFR Okeechobee FL	11830va	11910va
			13695va 17750va		
1400	1500		Zambia, Christian Voice	9555af	
1415	1430		Nepal, Radio	3230as	5005as 6100as
			7165as		
1430	1445	s	Germany, Pan American BC	15650as	
1430	1500		Australia, Radio	5995as	7240as
			9475as 9590pa 9625pa		
1430	1500	DRM/s	UK, BYU Radio	9565eu	
1430	1500	DRM	UK, Radio Australia	9770eu	
1430	1500	DRM/f	UK, Radio Korea Intl	9770eu	
1445	1500	as	Germany, Pan American BC		15650me

1500 UTC - 11AM EDT / 10AM CDT / 8AM PDT

1500	1515	s	Germany, Pan American BC	15650as	
1500	1515		Russia, FEBA	7320as	
1500	1528	s	Hungary, Radio Budapest	6025eu	9655eu
1500	1528		Vietnam, Voice of	9550va	9840va 12020va
			13860va		
1500	1530		Mongolia, Voice of	12015eu	
1500	1530		UK, BBC World Service		6190af 6195as
			7105as 9740as	11860af	11940af 12095af
			15310as 15400af	15420af	15485af
			17790as 17790as	21470af	21490af
			21660af		
1500	1555		South Africa, Channel Africa	17770af	
1500	1557		Canada, Radio Canada Intl	11675as	15360as
			17720as		
1500	1557		Netherlands, Radio	9345va	9890va 11835va
1500	1559	as	Canada, Radio Canada Intl	9515am	13655am
			17800am		
1500	1600		Anguilla, Caribbean Beacon	11775am	
1500	1600		Australia, Radio	5995as	7240as
			9475as 9590pa 9625pa		
1500	1600		Australia, Voice Intl	15205as	
1500	1600	as	Canada, CBC NQ SW Service	9625na	
1500	1600		Canada, CFRX Toronto ON	6070do	
1500	1600		Canada, CFVP Calgary AB	6030do	
1500	1600		Canada, CKZN St John's NF	6160do	
1500	1600		Canada, CKZU Vancouver BC	6160do	
1500	1600		China, China Radio Intl	6100af	7160as
			11775as 11965eu	13640eu	13685af
			13740na 17490eu	17630af	
1500	1600	DRM	China, China Radio Intl	9610va	
1500	1600		Costa Rica, University Network	9725va	11870va
			13750va		
1500	1600	a	Germany, Bible Voice Broadcasting	17510me	
1500	1600	m	Germany, Bible Voice Broadcasting	13590as	
1500	1600		Germany, Deutsche Welle	6140eu	
1500	1600		Germany, Overcomer Ministries	6110eu	
1500	1600	vl/ as	Greece, Voice of	9375va	9420va 9775va
			12105va 15630va		
1500	1600		Guam, TWR/KTWR	12105as	
1500	1600		Japan, Radio	6190as	7200as 9505va
			11730as		
1500	1600		Jordan, Radio	11690na	
1500	1600		Malaysia, Radio	7295as	
1500	1600		New Zealand, Radio NZ Intl	6095pa	
1500	1600		North Korea, Voice of	3560af	4405eu
			9335eu 11710na	15245va	
1500	1600	vl	Papua New Guinea, Wantok Radio Light		7120va
1500	1600		Russia, Voice of	4965me	7315af
			7325me 9810eu	11980eu	11985me
1500	1600		Singapore, Mediacorp Radio	6150do	
1500	1600		South Africa, Channel Africa	11825af	
1500	1600		UK, BBC World Service	15565eu	15575me
1500	1600		UK, Radio Taiwan Intl	9770eu	
1500	1600	DRM/f	UK, Sudan Radio Service	15530va	
1500	1600	vl/ mtwhf	USA, AFRTS	4319usb	5765usb
			7590usb 7812usb	12133usb	12579usb
			12133usb 12579usb	13362usb	13855usb
1500	1600		USA, KAIJ Dallas TX	13815na	
1500	1600		USA, KJES Vado NM	11715na	
1500	1600		USA, KTBN Salt Lake City UT		15590na
1500	1600		USA, KWHR Naalehu HI	11555as	

1500	1600		USA, Voice of America	7125va	9825va
			9850af 15195va 15445va	15580af	
1500	1600	mtwhf	USA, Voice of America	9645va	13690va
			15105va		
1500	1600		USA, WBCQ Kennebunk ME	17495na	
1500	1600		USA, WBOH Newport NC	5920am	
1500	1600		USA, WEWN Birmingham AL	9955na	11530na
			15745na		
1500	1600		USA, WHRA Greenbush ME	17640na	
1500	1600		USA, WHRI Noblesville IN	12020am	15285am
1500	1600	as	USA, WINB Red Lion PA	9740am	
1500	1600	mtwhf	USA, WINB Red Lion PA	13570am	
1500	1600		USA, WJIE Louisville KY	7490am	
1500	1600		USA, WRMI Miami FL 7385am		
1500	1600		USA, WTJC Newport NC	9370na	
1500	1600		USA, WWCR Nashville TN	9985na	12160na
			13845na 15825na		
1500	1600		USA, WYFR Okeechobee FL	11830va	11910va
			15520va 15770va		
1500	1600		Zambia, Christian Voice	9555af	
1505	1520	m	Austria, Radio Austria Intl	13775na	
1505	1530	as	Austria, Radio Austria Intl	13775na	
1515	1530	twhf	Austria, Radio Austria Intl	13775na	
1515	1600		Russia, FEBA	7320as	
1530	1545	w	Germany, Pan American BC	11610as	
1530	1545	s	Germany, Pan American BC	15650me	
1530	1600	mwh	Germany, Bible Voice Broadcasting	17510as	
1530	1600	s	Germany, Bible Voice Broadcasting	13590me	
1530	1600		Iran, Voice of the Islamic Rep	9635as	11650as
1530	1600	f	Russia, FEBA	9850as	
1530	1600		Russia, TWR	7535eu	7560as
1530	1600	mtwhf	South Korea, Radio Korea Intl	15725na	
1530	1600		UAE, AWR Africa	15225as	
1530	1600		UK, BBC World Service		6190af 11940af
			12095af 15400af	15485af	21470af
			21660af		
1530	1600		USA, Voice of America	6160va	9590va
			9760va 9845va 12040va	15550va	
1530	1600		Vatican City, Vatican Radio	12065as	13765as
			15235as		
1535	1300	as	Austria, Radio Austria Intl	13775na	
1540	1600	whf	Germany, Bible Voice Broadcasting	13590me	
1545	1600	m	Austria, Radio Austria Intl	13775na	
1545	1600	twhf	Austria, Radio Austria Intl	13775na	
1545	1600	a	Germany, Bible Voice Broadcasting	13590me	
1545	1600	s	Germany, Pan American BC	15650me	

1600 UTC - 12PM EDT / 11AM CDT / 9AM PDT

1600	1615	mwf	Germany, Bible Voice Broadcasting	13590me	
1600	1615		Pakistan, Radio	4790va	5027af 5080va
			11570va 15100va		
1600	1627		Czech Rep, Radio Prague Intl	5930eu	17485af
1600	1627		Iran, Voice of the Islamic Rep	9635as	11650as
1600	1628		Vietnam, Voice of	7280va	9550va 9730va
			11630va 13860va		
1600	1630	s	Germany, Pan American BC	15650	su
1600	1630		Guam, AWR/KSDA	11640as	11680as
1600	1630		Guam, TWR/KTWR	12105as	
1600	1630		Jordan, Radio	11690na	
1600	1630		Myanmar, Radio	9730do	
1600	1645		Russia, FEBA	9850as	
1600	1650		New Zealand, Radio NZ Intl		6095pa
1600	1700		Anguilla, Caribbean Beacon	11775am	
1600	1700		Australia, Radio	5995as	6080as 7240as
			9475as 9710as		
1600	1700		Australia, Voice Intl	11840as	13635as 15205as
1600	1700	DRM/s	Austria, CVC International	9705eu	
1600	1700	a	Canada, CBC NQ SW Service	9625na	
1600	1700		Canada, CFRX Toronto ON	6070do	
1600	1700		Canada, CFVP Calgary AB	6030do	
1600	1700		Canada, CKZN St John's NF	6160do	
1600	1700		Canada, CKZU Vancouver BC	6160do	
1600	1700		China, China Radio Intl	6100af	9570af
			11900af 11940eu	11965eu	13760eu
			17490eu		
1600	1700	DRM	China, China Radio Intl	17510va	
1600	1700		Costa Rica, University Network	11870va	13750va
1600	1700		Ethiopia, Radio	5990af	7110af 7165af
			9560af 9704af	11800af	
1600	1700		France, Radio France Intl	7170af	15160af
			15605af 17605af	17850af	
1600	1700	s	Germany, Bible Voice Broadcasting	13590me	
1600	1700		Germany, Deutsche Welle	6140as	7225as
			17595as		
1600	1700		Germany, Overcomer Ministries	9845eu	
1600	1700	vl	Greece, Voice of	7475va	9420va 12105va
			15630va 17705va		
1600	1700		Malaysia, Radio	7295as	
1600	1700		North Korea, Voice of		3560va 9990me
			11545va		
1600	1700	vl	Papua New Guinea, Wantok Radio Light		7120va
1600	1700		Russia, Voice of	6070va	9405as 11640as

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1600	1700		11985af	12055va	12115va	15540va	1700	1800	as	Russia, Voice of	11675eu		
1600	1700		South Korea, Radio Korea Intl		5975va	9870va	1700	1800		UK, BBC World Service	3915as	5975as	
1600	1700		Taiwan, Radio Taiwan Intl		11815as					6195eu 7160as	9510as	12095va	15310as
			UK, BBC World Service		3915as	5975as				15565va			
			6190af 6195as	7160as	9410eu	9510as	1700	1800	vl/ mtwhf	UK, Sudan Radio Service	11715va		
			11940af	12095va	15105as	15310as	1700	1800		UK, Voice Africa	13820af		
			15400af	15420af	15485af	15565va	1700	1800		USA, AFRTS	4319usb	5446usb	5765usb
			17790as	17820af	17830af	21470af				7590usb	7812usb	12133usb	12579usb
			21490af	21660af						12133usb	12579usb	13362usb	13855usb
1600	1700	DRM/w	UK, BYU Radio	9770eu			1700	1800		USA, KAIJ Dallas TX	13815na		
1600	1700	DRM/f	UK, NHK/Radio Japan		9770eu		1700	1800		USA, KTBN Salt Lake City UT	15590na		
1600	1700	vl/ mtwhf	UK, Sudan Radio Service		15530va		1700	1800		USA, KWHR Naalehu HI	11555as		
1600	1700		UK, Voice Africa	13820af			1700	1800		USA, Voice of America	6160va	7125va	
1600	1700		USA, AFRTS	4319usb	5446usb	5765usb				9345va 9850af	15410af		
			7590usb	7812usb	12133usb	12579usb	1700	1800		USA, WBCQ Kennebunk ME	9330na	17495na	
			12133usb	12579usb	13362usb	13855usb	1700	1800		USA, WBOH Newport NC	5920am		
1600	1700		USA, KAIJ Dallas TX	13815na			1700	1800		USA, WEWN Birmingham AL	11530va	13615va	
1600	1700		USA, KJES Vado NM	11715na						15685va	15745va		
1600	1700		USA, KTBN Salt Lake City UT		15590na		1700	1800		USA, WHRA Greenbush ME	17640na		
1600	1700		USA, KWHR Naalehu HI	11555as			1700	1800		USA, WHRI Noblesville IN	15285am	15785am	
1600	1700		USA, Voice of America	4930af	6160va		1700	1800	as	USA, WINB Red Lion PA	9740am		
			7125va 9700va	9760va	9825va	9850af	1700	1800		USA, WJIE Louisville KY	7490am		
			12080va	13600va	15195va	15445va	1700	1800	mtwhfa	USA, WMLK Bethel PA 9265eu			
			15580af	17895va			1700	1800		USA, WMLK Bethel PA 15265eu			
1600	1700		USA, WBCQ Kennebunk ME	9330na	17495na		1700	1800		USA, WRMI Miami FL 7385am			
1600	1700		USA, WBOH Newport NC	5920am			1700	1800		USA, WTJC Newport NC	9370na		
1600	1700		USA, WEWN Birmingham AL	11530va	13615va		1700	1800		USA, WWCR Nashville TN	9985na	12160na	
			15685va	15745va						13845na	15825na		
1600	1700		USA, WHRA Greenbush ME	17640na			1700	1800		USA, WWRB Manchester TN	9320na	11920na	
1600	1700		USA, WHRI Noblesville IN	12020am	15285am					12170na			
1600	1700	as	USA, WINB Red Lion PA	9740am			1700	1800	mtwhf	USA, WWRB Manchester TN	15250na		
1600	1700	mtwhf	USA, WINB Red Lion PA	13570as			1700	1800		USA, WYFR Okeechobee FL	3955va	13695va	
1600	1700		USA, WJIE Louisville KY	7490am						17795va	18980va	21455va	21680va
1600	1700	mtwhfa	USA, WMLK Bethel PA 9265eu				1700	1800		Zambia, Christian Voice	4965af		
1600	1700		USA, WRMI Miami FL 7385am				1700	1800	mtwhf	USA, WINB Red Lion PA	13570am		
1600	1700		USA, WTJC Newport NC	9370na			1730	1745		Israel, Kol Israel	9345va	11590va	15640va
1600	1700		USA, WWCR Nashville TN	9985na	12160na		1730	1745	vl	Libya, Voice of Africa	11860af		
			13845na	15825na			1730	1745	mtwhf	UK, United Nations Radio	7150af	15495me	
1600	1700		USA, WWRB Manchester TN	9320na	12170na					17810af			
1600	1700	mtwhf	USA, WWRB Manchester TN	15250na			1730	1800		Bulgaria, Radio	9500eu	11500eu	
1600	1700		USA, WYFR Okeechobee FL	6085va	11830va		1730	1800		Guam, AWR/KSDA	9385me		
			11865va	13695va	15520va	17750va	1730	1800		Liberia, ELWA	4760do		
			18980va	21455va	21525va		1730	1800		Philippines, Radio Pilipinas	11720va	15190va	
1600	1700		Zambia, Christian Voice	4965af						17720va			
1615	1630		Vatican City, Vatican Radio	4005eu	5885eu		1730	1800		Swaziland, TWR	3200af	9500af	
			7250eu 9645me	15595me			1730	1800		Sweden, Radio	6065va		
1615	1700	as	UK, BBC World Service	11860af			1730	1800	mtwhf	USA, Voice of America	4930af	11975af	
1630	1700		Egypt, Radio Cairo	11880af						17895af			
1630	1700		Guam, AWR/KSDA	11975as			1730	1800		Vatican City, Vatican Radio	11625af	13765af	
1640	1700	t	Germany, Bible Voice Broadcasting	13590me						15570af			
1651	1700		New Zealand, Radio NZ Intl	6095pa			1740	1800	as	USA, Voice of America	4930af	11975af	

1700 UTC - 1PM EDT / 12PM CDT / 10AM PDT

1700	1710	mtwh	Moldova, Radio PMR	5960eu		
1700	1720	f	Moldova, Radio PMR	5960eu		
1700	1727		Czech Rep, Radio Prague Intl	5930eu	17485af	
1700	1728		Vietnam, Voice of	9725eu		
1700	1730		France, Radio France Intl	15605af	17605af	
1700	1730	DRM	Netherlands, Radio	5955eu		
1700	1730		Swaziland, TWR	3200af		
1700	1745		UK, BBC World Service	3255af	6005af	
			6190af 9630af	12095af	15400af	
			15420af	17820af	17830af	21470af
1700	1755		South Africa, Channel Africa	15325af		
1700	1759		Poland, Radio Polonia	5965eu		
1700	1800		Anguilla, Caribbean Beacon	11775am		
1700	1800		Australia, Radio	5995as	9475as	
			9580as 9710as			
1700	1800		Australia, Voice Intl	11840as	13635as	15205as
1700	1800	a	Canada, CBC NQ SW Service	9625na		
1700	1800		Canada, CFRX Toronto ON	6070do		
1700	1800		Canada, CFVP Calgary AB	6030do		
1700	1800		Canada, CKZN St John's NF	6160do		
1700	1800		Canada, CKZU Vancouver BC	6160do		
1700	1800		China, China Radio Intl	9695eu	11940eu	
			13760eu			
1700	1800	DRM	China, China Radio Intl	12080va		
1700	1800		Costa Rica, University Network	11870va	13750va	
1700	1800		Egypt, Radio Cairo	11880af		
1700	1800		Eat Guinea, Radio Africa	15190af		
1700	1800	s	Germany, Bible Voice Broadcasting	13590me		
1700	1800	DRM	Germany, Deutsche Welle	6140eu		
1700	1800		Germany, Overcomer Ministries	9845eu		
1700	1800	vl	Greece, Voice of	7475va	9420va	12105va
			15630va	17705va		
1700	1800		Japan, Radio	9535va	11970eu	15355af
1700	1800		Malaysia, Radio	7295as		
1700	1800		New Zealand, Radio NZ Intl	6095pa		
1700	1800		Nigeria, Voice of	15120va		
1700	1800	vl	Papua New Guinea, Wantok Radio Light		7120va	
1700	1800		Russia, Voice of	7390eu	9405as	9820eu
			9890eu 11510af	11985af		

1800 UTC - 2PM EDT / 1PM CDT / 11AM PDT

1800	1810		Zanzibar, Radio Tanzania	11735af		
1800	1815	a	Germany, Bible Voice Broadcasting	11965as		
1800	1828		Vietnam, Voice of	7280va	9730va	
1800	1829	s	Germany, Universal Life	15675af		
1800	1830	w f	Austria, AWR Europe	15280af		
1800	1830	DRM/a	Canada, Voice of NASB	11900na		
1800	1830		Egypt, Radio Cairo	11880af		
1800	1830	s	Germany, Bible Voice Broadcasting	6015eu		
1800	1830		South Africa, AWR Africa	3215af	3345af	
1800	1830		Swaziland, TWR	3200af		
1800	1830		UK, BBC World Service	3255as	5975as	
			6190af 9510as	12095va	15400af	15420af
			17830af	21470af		
1800	1850		New Zealand, Radio NZ Intl	6095pa		
1800	1856		Romania, Radio Romania Intl	9635eu	11830eu	
1800	1857		Netherlands, Radio	6020af	9895af	11655af
1800	1859		Canada, Radio Canada Intl	9530af	9780af	
			13730af	15255af		
1800	1900		Anguilla, Caribbean Beacon	11775am		
1800	1900	mtwhf	Argentina, RAE	9690eu	15345eu	
1800	1900		Australia, Radio	6080as	7240as	9475as
			9580as 9710as			
1800	1900		Australia, Voice Intl	11685as		
1800	1900		Bangladesh, Bangla Betar	7185as		
1800	1900		Canada, CFRX Toronto ON	6070do		
1800	1900		Canada, CFVP Calgary AB	6030do		
1800	1900		Canada, CKZN St John's NF	6160do		
1800	1900		Canada, CKZU Vancouver BC	6160do		
1800	1900		China, China Radio Intl	9695eu	11940eu	

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1800	1900	DRM	13760eu		
1800	1900		China, China Radio Intl	12080va	
1800	1900		Costa Rica, University Network	11870va	13750va
1800	1900		Eqt Guinea, Radio Africa	15190af	
1800	1900	a	Germany, Bible Voice Broadcasting	6015as	9430me
1800	1900	s	Germany, Bible Voice Broadcasting	9430me	
1800	1900		India, All India Radio	7410eu	9950eu
1800	1900		11620eu	11935af	13605af
1800	1900		15155af	17670af	15075af
1800	1900		Liberia, ELWA	4760do	
1800	1900		Malaysia, Radio	7295as	
1800	1900		Nigeria, Voice of	15120va	
1800	1900		North Korea, Voice of	4405eu	13760eu
1800	1900		15245eu		
1800	1900	vi	Papua New Guinea, Wantok Radio	7120va	
1800	1900		Philippines, Radio Pilipinas	11720va	15190va
1800	1900		17720va		
1800	1900		Russia, Voice of	9480eu	9745af
1800	1900		11510af		9890eu
1800	1900		Taiwan, Radio Taiwan Intl	3965eu	
1800	1900		UK, BBC World Service	6195eu	9410eu
1800	1900		12095me	15310me	
1800	1900		USA, AFRTS	4319usb	5446usb
1800	1900		7590usb	7812usb	5765usb
1800	1900		12133usb	12579usb	12579usb
1800	1900		12133usb	12579usb	13855usb
1800	1900		USA, KAJI Dallas TX	13815na	
1800	1900		USA, KTNB Salt Lake City UT	15590na	
1800	1900		USA, Voice of America	4930af	9850af
1800	1900		11975af	15410af	15580af
1800	1900		USA, WBCQ Kennebunk ME	7415na	9330na
1800	1900		17495na		
1800	1900		USA, WBOH Newport NC	5920am	
1800	1900		USA, WEWN Birmingham AL	11530va	13615va
1800	1900		15685va	15745va	
1800	1900		USA, WHRA Greenbush ME	17640na	
1800	1900		USA, WHRI Noblesville IN	15285am	15785am
1800	1900	as	USA, WINB Red Lion PA	9740am	
1800	1900	mtwhf	USA, WINB Red Lion PA	13570am	
1800	1900		USA, WJIE Louisville KY	7490am	
1800	1900	mtwhfa	USA, WMLK Bethel PA 9265eu		
1800	1900		USA, WMLK Bethel PA 15265eu		
1800	1900		USA, WRMI Miami FL 7385am		
1800	1900		USA, WTJC Newport NC	9370na	
1800	1900		USA, WWCR Nashville TN	9975na	12160na
1800	1900		13845na	15825na	
1800	1900		USA, WWRB Manchester TN	9320na	11920na
1800	1900		12170na		
1800	1900	mtwhf	USA, WWRB Manchester TN	15250na	
1800	1900		USA, WYFR Okeechobee FL	13695eu	13780eu
1800	1900		13800eu	17795eu	18980va
1800	1900		Yemen, Rep of Yemen Radio	9780me	
1800	1900		Zambia, Christian Voice	4965af	
1815	1830	vi	Libya, Voice of Africa	9485af	11715af
1830	1845		11860af	15660af	17695af
1830	1858		Sweden, IBRA Radio	9485eu	
1830	1900	vi	Serbia & Montenegro, Intl Radio	6100eu	
1830	1900		Greece, Voice of	7475va	12105va
1830	1900		15630va	17705va	
1830	1900		South Africa, AWR Africa	9590af	
1830	1900		Turkey, Voice of	9785eu	
1830	1900		UK, BBC World Service	3255af	3915as
1830	1900		6005af 6190af	9410af	9630af
1830	1900		15400af	15420af	12095af
1830	1900		15400af	15420af	12095af
1845	1858	mtwhfa	Albania, Radio Tirana	6115eu	7210eu
1845	1900		Congo, RTV Congolaise	4765af	5985af
1851	1900		New Zealand, Radio NZ Intl	9845pa	

1900 UTC - 3PM EDT / 2PM CDT / 12PM PDT

1900	1915		Congo, RTV Congolaise	4765af	5985af
1900	1915	fs	Germany, Bible Voice Broadcasting	9430me	
1900	1920		Turkey, Voice of	9785eu	
1900	1925		Israel, Kol Israel	11590va	15615va
1900	1928		Hungary, Radio Budapest	3975eu	6025eu
1900	1928		Vietnam, Voice of	7280va	
1900	1929	s	Germany, Universal Life	13820me	
1900	1930	a	Germany, Bible Voice Broadcasting	9430af	
1900	1930		Lithuania, Radio Vilnius	9710eu	
1900	1930		Philippines, Radio Pilipinas	11720va	15190va
1900	1930		17720va		
1900	1945		India, All India Radio	7410eu	9445af
1900	1945		11620eu	11935af	9950eu
1900	1945		15155af	17670af	13605af
1900	1950		New Zealand, Radio NZ Intl	9845pa	15075af
1900	2000		Anguilla, Caribbean Beacon	11775am	
1900	2000		Australia, Radio	6080as	7240as
1900	2000		9580as 9710as		9500as
1900	2000		Australia, Voice Intl	11685as	
1900	2000		Canada, CFRX Toronto ON	6070do	
1900	2000		Canada, CFVP Calgary AB	6030do	
1900	2000		Canada, CKZN St John's NF	6160do	
1900	2000		Canada, CKZU Vancouver BC	6160do	
1900	2000		Canada, Radio Canada Intl	17765am	

1900	2000		China, China Radio Intl	7295va	9440af
1900	2000		11940eu		
1900	2000	DRM	China, China Radio Intl	12080va	
1900	2000		Costa Rica, University Network	11870va	13750va
1900	2000		Eqt Guinea, Radio Africa	15190af	
1900	2000		Germany, Deutsche Welle	13780af	15520af
1900	2000	vi	Ghana, Ghana BC Corp	3366do	4915do
1900	2000	vi	Italy, IRRS 5775va		
1900	2000		Liberia, ELWA	4760do	
1900	2000		Malaysia, Radio	7295as	
1900	2000	vi	Namibia, Namibian BC Corp	3270do	3290do
1900	2000		6060do 6175do		
1900	2000		Netherlands, Radio	7120af	9895af
1900	2000		17810af		11655af
1900	2000	as	Netherlands, Radio	15315na	17660na
1900	2000		Nigeria, Radio/Ibadan	6050do	17735na
1900	2000		Nigeria, Radio/Kaduna	4770do	6090do
1900	2000		Nigeria, Radio/Lagos	3326do	4990do
1900	2000		Nigeria, Voice of	7255va	
1900	2000		North Korea, Voice of	4405eu	9975eu
1900	2000		11535eu		11910eu
1900	2000		Papua New Guinea, Catholic Radio		4960do
1900	2000		Papua New Guinea, NBC	4890do	
1900	2000	vi	Papua New Guinea, Wantok Radio	7120va	
1900	2000		Russia, Voice of	7380eu	9890eu
1900	2000		Sierra Leone, Radio UNAMSIL	6137do	
1900	2000	irreg/ vi	Sierra Leone, SLBS	3316do	
1900	2000	vi	Solomon Islands, SIBC	5020do	9545do
1900	2000	m	South Africa, Radio League	3215af	
1900	2000		South Korea, Radio Korea Intl	5975va	7275eu
1900	2000	a	Sri Lanka, SLBC	6010eu	
1900	2000		Swaziland, TWR	3200af	
1900	2000		Thailand, Radio	7155eu	
1900	2000	vi	Uganda, Radio	4976do	5026do
1900	2000		UK, BBC World Service	3255af	6005af
1900	2000		6190af 6195eu	9410va	9630af
1900	2000		15310me	15400af	12095af
1900	2000		USA, AFRTS	4319usb	5446usb
1900	2000		7590usb	7812usb	5765usb
1900	2000		12133usb	12579usb	12579usb
1900	2000		12133usb	12579usb	13855usb
1900	2000		USA, KAJI Dallas TX	13815na	
1900	2000		USA, KJES Vado NM	15385na	
1900	2000		USA, KTNB Salt Lake City UT	15590na	
1900	2000		USA, Voice of America	4930af	6040af
1900	2000		9670va 9850af	11975af	13635va
1900	2000		15410af	15445af	13760af
1900	2000		USA, WBCQ Kennebunk ME	7415na	9330na
1900	2000		17495na		
1900	2000		USA, WBOH Newport NC	5920am	
1900	2000		USA, WEWN Birmingham AL	11530va	13615va
1900	2000		15685va	15745va	
1900	2000		USA, WHRA Greenbush ME	15665na	
1900	2000		USA, WHRI Noblesville IN	15285am	15785am
1900	2000	as	USA, WINB Red Lion PA	9740am	
1900	2000	mtwhf	USA, WINB Red Lion PA	13570am	
1900	2000		USA, WJIE Louisville KY	7490am	
1900	2000	mtwhfa	USA, WMLK Bethel PA 9265eu		
1900	2000		USA, WMLK Bethel PA 15265eu		
1900	2000		USA, WRMI Miami FL 7385am		
1900	2000		USA, WTJC Newport NC	9370na	
1900	2000		USA, WWCR Nashville TN	9975na	12160na
1900	2000		13845na	15825na	
1900	2000		USA, WWRB Manchester TN	9320na	11920na
1900	2000		12170na		
1900	2000	mtwhf	USA, WWRB Manchester TN	15250na	
1900	2000		USA, WYFR Okeechobee FL	3230af	6085af
1900	2000		13695af	13800af	17795af
1900	2000		18930af	18980va	
1900	2000		Zambia, Christian Voice	4965af	
1900	2000	vi	Zimbabwe, ZBC Corp	5975do	
1915	1930	vi	Libya, Voice of Africa	11635af	11715af
1925	1945		Armenia, Voice of	4810eu	9965as
1930	1945	vi	Libya, Voice of Africa	11715af	
1930	2000	mtwhf	Belarus, Radio	7105eu	7280eu
1930	2000	as	Germany, Bible Voice Broadcasting	9430af	
1930	2000		Iran, Voice of the Islamic Rep	7205eu	9800eu
1930	2000		9925af 11860af		
1930	2000		Sweden, Radio	6065va	
1930	2000	ws	UK, Salama Radio	11885va	
1935	1955		Italy, RAI Intl	5960eu	9845eu
1945	2000	DRM	Canada, Vatican Radio	9800na	
1945	2000	vi	Rwanda, Radio	6055do	
1950	2000		Vatican City, Vatican Radio	4005eu	5885eu
1950	2000		7250eu 9645eu		
1951	2000		New Zealand, Radio NZ Intl	11725pa	

2000 UTC - 4PM EDT / 3PM CDT / 1PM PDT

2000	2027		Czech Rep, Radio Prague Intl	5930eu	11600va
2000	2027		Iran, Voice of the Islamic Rep	7205eu	9800eu
2000	2030		9925af 11860af		
2000	2030		Australia, Voice Intl	11685as	
2000	2030	DRM	Canada, Vatican Radio	9800na	

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2000	2030		Mongolia, Voice of	12015eu		
2000	2030		Swaziland, TWR	3200af		
2000	2030	ws	UK, Salama Radio	11885va		
2000	2030		USA, Voice of America	4930af	4940af	
			9850af 11975af	13670af	15410af	15445af
2000	2030		Vatican City, Vatican Radio	9755af	11625af	
			13765af			
2000	2050		New Zealand, Radio NZ Intl	11725pa		
2000	2057	as	Netherlands, Radio	15315na	17735na	
2000	2057	as	Netherlands, Radio	15315na	17660na	17735na
2000	2059		Canada, Radio Canada Intl	5850eu	11765eu	
			15325eu			
2000	2059	mtwhf	Spain, Radio Exterior Espana	9570af	15290eu	
2000	2100		Anguilla, Caribbean Beacon	11775am		
2000	2100		Australia, ABC NT Alice Springs	2310do	4835irr	
2000	2100		Australia, ABC NT Katherine	2485do		
2000	2100		Australia, ABC NT Tennant Creek	2325do		
2000	2100		Australia, Radio	9500pa	11650as	11660as
			12080as			
2000	2100		Canada, CFRX Toronto ON	6070do		
2000	2100		Canada, CFVP Calgary AB	6030do		
2000	2100		Canada, CKZN St John's NF	6160do		
2000	2100		Canada, CKZU Vancouver BC	6160do		
2000	2100		Canada, Radio Canada Intl	17765am		
2000	2100		China, China Radio Intl	5960eu	7285eu	
			7295va 9600eu	9855eu	11640af	11790eu
			13630af			
2000	2100	DRM	China, China Radio Intl	12080va		
2000	2100		Costa Rica, University Network	13750va		
2000	2100		Eqt Guinea, Radio Africa	15190af		
2000	2100		Germany, Deutsche Welle	7130af	11865af	
			13780af	15205af		
2000	2100	vl	Ghana, Ghana BC Corp	3366do	4915do	
2000	2100		Indonesia, Voice of	9525as	11785pa	15150al
2000	2100	vl	Italy, IRRS 5775va			
2000	2100		Liberia, ELWA	4760do		
2000	2100		Malaysia, Radio	7295as		
2000	2100	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060do 6175do			
2000	2100		Nigeria, Radio/Ibadan	6050do		
2000	2100		Nigeria, Radio/Kaduna	4770do	6090do	
2000	2100		Nigeria, Radio/Lagos	3326do	4990do	
2000	2100		Nigeria, Voice of	7255va		
2000	2100		Papua New Guinea, Catholic Radio		4960do	
2000	2100		Papua New Guinea, NBC	4890do		
2000	2100	vl	Papua New Guinea, Wantok Radio Light		7120va	
2000	2100		Russia, Voice of	7310eu	7330eu	
2000	2100		Sierra Leone, Radio UNAMSIL	6137do		
2000	2100	vl	Solomon Islands, SIBC	5020do	9545do	
2000	2100		South Africa, AWR Africa	7175af		
2000	2100		South Africa, Channel Africa	3345af		
2000	2100	vl	Uganda, Radio	4976do	5026do	7196do
2000	2100		UK, BBC World Service	3255af	6005af	
			6195af 9410af	9630af	12095af	15400af
			17830af			
2000	2100		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
2000	2100		USA, KAIJ Dallas TX	13815na		
2000	2100		USA, KJES Vado NM	15385na		
2000	2100		USA, KTBN Salt Lake City UT		15590na	
2000	2100		USA, Voice of America	13635va	6040va	9670va
2000	2100		USA, WBCQ Kennebunk ME	7415na	9330na	
			17495na			
2000	2100		USA, WBOH Newport NC	5920am		
2000	2100		USA, WEWN Birmingham AL	11530va	13615va	
			15745va	17595va		
2000	2100		USA, WHRA Greenbush ME	15665na		
2000	2100		USA, WHRI Noblesville IN	15285am	15785am	
2000	2100		USA, WINB Red Lion PA	13570am		
2000	2100		USA, WINB Red Lion PA	13570am		
2000	2100		USA, WJIE Louisville KY	7490am		
2000	2100	mtwhfa	USA, WMLK Bethel PA 9265eu			
2000	2100		USA, WMLK Bethel PA 15265eu			
2000	2100		USA, WRMI Miami FL 7385am			
2000	2100		USA, WTJC Newport NC	9370na		
2000	2100		USA, WWCR Nashville TN	9975na	12160na	
			13845na	15825na		
2000	2100		USA, WWRB Manchester TN	9320na	11920na	
			12170na			
2000	2100	mtwhf	USA, WWRB Manchester TN	15250na		
2000	2100		USA, WYFR Okeechobee FL	3230va	13800va	
			15195va	17725af	17750va	17795va
			17845va	18980va		
2000	2100		Zambia, Christian Voice	4965af		
2000	2100	vl	Zimbabwe, ZBC Corp 5975do			
2005	2100		Syria, Radio Damascus	9330eu	12085eu	
2025	2045		Italy, RAI Intl	6050af	11875af	
2030	2045	vl	Libya, Voice of Africa	11635af		
2030	2045		Thailand, Radio	9680eu		
2030	2058		Vietnam, Voice of	7280va	9550va	7280va
			9550va 11630va			
2030	2100	DRM	Canada, Radio Netherlands	9800na		
2030	2100		Cuba, Radio Havana	9505va	11760va	

2030	2100		Egypt, Radio Cairo	15375af		
2030	2100		Turkey, Voice of	9730va		
2030	2100		USA, Voice of America	11975af	12140as	4930af 9850af 15410af
			15445af			
2030	2100		Uzbekistan, Radio Tashkent	11905eu	5025eu	9545eu
2045	2100		India, All India Radio	7410eu	9445eu	9910pa
			9950eu 11620pa	11715pa		
2051	2100		New Zealand, Radio NZ Intl		15720pa	

2100 UTC - 5PM EDT / 4PM CDT / 2PM PDT

2100	2120		Turkey, Voice of	9730as		
2100	2128		Hungary, Radio Budapest	6025eu	9525af	
2100	2128		Serbia & Montenegro, Intl Radio	6100eu		
2100	2130		Australia, ABC NT Katherine	2485do		
2100	2130		Australia, ABC NT Tennant Creek	2325do		
2100	2130	s	Belarus, Radio	7105eu		
2100	2130	a	Canada, CBC NQ SW Service	9625na		
2100	2130		China, China Radio Intl	11640af	13630af	
2100	2130		Cuba, Radio Havana	9505va	11760va	
2100	2130	mtwhf	UK, BBC World Service	11675am		
2100	2145		Nigeria, Radio/Ibadan	6050do		
2100	2157	DRM	China, China Radio Intl	12080va		
2100	2159		Canada, Radio Canada Intl	17765am		
2100	2159	DRM	Canada, Radio Canada Intl	9800na		
2100	2159	as	Spain, Radio Exterior Espana	9570va	9840va	
2100	2200		Anguilla, Caribbean Beacon	11775am		
2100	2200		Australia, ABC NT Alice Springs	2310do	4835irr	
2100	2200		Australia, Radio	9660as	11650as	11660as
			12080pa	13630pa	15515pa	
2100	2200		Austria, AWR Europe	9715af		
2100	2200		Bulgaria, Radio	5800eu	7500eu	
2100	2200		Canada, CFRX Toronto ON	6070do		
2100	2200		Canada, CFVP Calgary AB	6030do		
2100	2200		Canada, CKZN St John's NF	6160do		
2100	2200		Canada, CKZU Vancouver BC	6160do		
2100	2200		Costa Rica, University Network	13750va		
2100	2200		Egypt, Radio Cairo	15375af		
2100	2200		Eqt Guinea, Radio Africa		15190af	
2100	2200		Germany, Deutsche Welle	15205af	9440af	11865af
2100	2200	vl	Ghana, Ghana BC Corp	3366do	4915do	
2100	2200		Guyana, Voice of	3291do	5950do	
2100	2200		India, All India Radio	7410eu	9445eu	9910pa
			9950eu 11620pa	11715pa		
2100	2200	vl/as	Italy, IRRS 5775va			
2100	2200		Japan, Radio	6035pa	6055eu	6180eu
			11855af	17825na	21670pa	
2100	2200		Liberia, ELWA	4760do		
2100	2200		Liberia, Star Radio	11965af		
2100	2200		Malaysia, Radio	7295as		
2100	2200	vl	Namibia, Namibian BC Corp	3270do	3290do	
			6060do 6175do			
2100	2200		New Zealand, Radio NZ Intl	15720pa		
2100	2200		Nigeria, Radio/Kaduna	4770do	6090do	
2100	2200		Nigeria, Radio/Lagos	3326do	4990do	
2100	2200		North Korea, Voice of	4405eu	13760eu	15245eu
2100	2200		Papua New Guinea, Catholic Radio		4960do	
2100	2200		Papua New Guinea, NBC	4890do		
2100	2200	vl	Papua New Guinea, Wantok Radio Light		7120va	
2100	2200	irreg/ vl	Rwanda, Radio	6055do		
2100	2200		Sierra Leone, Radio UNAMSIL	6137do		
2100	2200		Sierra Leone, SLBS	3316do		
2100	2200		South Africa, Channel Africa	3345af		
2100	2200		South Korea, Radio Korea Intl	3955eu		
2100	2200		Syria, Radio Damascus	9330eu	12085eu	
2100	2200		UK, BBC World Service	3255af	3915as	
			5965as 6005af	6110as	6190af	6195as
			9410af 9605af	15390am	15400af	
2100	2200		Ukraine, Radio Ukraine Intl	7490eu		
2100	2200		USA, AFRTS	4319usb	5446usb	5765usb
			7590usb	7812usb	12133usb	12579usb
			12133usb	12579usb	13362usb	13855usb
2100	2200		USA, KAIJ Dallas TX	13815na		
2100	2200		USA, KTBN Salt Lake City UT		15590na	
2100	2200		USA, Voice of America	12140as	15445af	11975af
2100	2200		USA, WBCQ Kennebunk ME	7415na	9330na	
			17495na			
2100	2200		USA, WBOH Newport NC	5920am		
2100	2200		USA, WEWN Birmingham AL	11530va	13615va	
			15745va	17595va		
2100	2200		USA, WHRA Greenbush ME	11765na		
2100	2200		USA, WHRI Noblesville IN	15285am	15785am	
2100	2200		USA, WINB Red Lion PA	13570am		
2100	2200		USA, WJIE Louisville KY	7490am		
2100	2200		USA, WMLK Bethel PA 15265eu			
2100	2200		USA, WRMI Miami FL 7385am			
2100	2200		USA, WTJC Newport NC	9370na		
2100	2200		USA, WWCR Nashville TN	9975na	12160na	

Shortwave Guide



2100	2200		13845na USA, WWRB Manchester TN 12170na	15825na 9320na	11920na	2230	2259		Canada, Radio Canada Intl 12035as	9525as	9870as		
2100	2200	mtwhf	USA, WWRB Manchester TN USA, WYFR Okeechobee FL 17725va	15250na 11565va 17845va	13800va 18980va	2230	2300	as DRM	Australia, HCJB Canada, Radio Sweden Guam, AWR/KSDA USA, Voice of America 15145va	15525as 11850as 9570va	9800na 15320as 13755va		
2100	2200	vi	Zambia, Christian Voice Zimbabwe, ZBC Corp Spain, Radio Exterior Espana	5975do 9570va	9840va	2245	2300		India, All India Radio 11645as	9705as 13605as	9950as 11620as		
2105	2159	vi	Libya, Voice of Africa Egypt, Radio Cairo UK, BBC World Service	11635af 9990eu									
2115	2130	ff	Romania, Radio Romania Intl 9645eu	11720am 7165eu	9535eu								
2130	2145	mtwhfa	Albania, Radio Tirana Australia, ABC NT Katherine Australia, ABC NT Tennant Creek Canada, CBC NQ SW Service Sweden, Radio Uzbekistan, Radio Tashkent 11905eu	7120eu 5025do 4910do 9625na 7420va 5025eu	9545eu								
2130	2156												
2300 UTC - 7PM EDT / 6PM CDT / 4PM PDT													
2130	2158	mtwhfa	Anguilla, Caribbean Beacon Australia, ABC NT Alice Springs Australia, ABC NT Katherine Australia, ABC NT Tennant Creek Australia, HCJB Bulgaria, Radio Canada, BBC World Service Canada, CBC NQ SW Service Canada, CFRX Toronto ON Canada, CFVP Calgary AB Canada, CKZN St John's NF Canada, CKZU Vancouver BC China, China Radio Intl 6145na Costa Rica, University Network Cuba, Radio Havana Egypt, Radio Cairo Germany, Deutsche Welle 15135as Ghana, Ghana BC Corp Guyana, Voice of India, All India Radio 11645as Malaysia, Radio Namibia, Namibian BC Corp 6060do New Zealand, Radio NZ Intl Papua New Guinea, Catholic Radio Papua New Guinea, NBC Papua New Guinea, Wantok Radio Sierra Leone, Radio UNAMSIL Sierra Leone, SLBS Singapore, MediCorp Radio Solomon Islands, SIBC UK, BBC World Service USA, AFRTS 7590usb 12133usb USA, KAIJ Dallas TX USA, KATN Salt Lake City UT USA, Voice of America USA, WBCQ Kennebunk ME 9330na USA, WBOH Newport NC USA, WEWN Birmingham AL USA, WHRA Greenbush ME USA, WHRI Noblesville IN USA, WINB Red Lion PA USA, WJIE Louisville KY USA, WRMI Miami FL USA, WRMI Miami FL USA, WTJC Newport NC USA, WWCR Nashville TN 12160na USA, WWRB Manchester TN 5085na USA, WYFR Okeechobee FL 17750va Zambia, Christian Voice Nigeria, Radio/Kaduna Nigeria, Radio/Lagos Australia, Radio 13630pa UK, BBC World Service 6195as USA, Voice of America 15145va Romania, Radio Romania Intl 9645eu Australia, Radio 13630pa 17795pa Burma, Dem Voice of Burma Lithuania, Radio Vilnius UK, BBC World Service 11955as USA, Voice of America Vietnam, Voice of	6090am 2310do 5025do 4910do 15525as 9700na 9800na 9625na 6070do 6030do 6160do 6160do 5915as 13680na 9550as 3366do 3291do 9705as 13605as 7295as 3270do 15720pa 4960do 9675do 7120va 6137do 3316do 6150do 5020do 5975am 5446usb 12133usb 13362usb 13815na 15590na 12140as 5105na 5920am 9355va 7520na 9495am 9320am 7490am 7385am 9955am 9370na 7465na 3185na 11740va 4965af 4770do 3326do 12080as 15240pa 3915as 11945as 9570va 6140eu 12080as 15415pa 21740pa 9435eu 9875na 9740as 15280as 7260va 12020va	4835irr 13680na 9890as 4915do 11620as 3290do 9545do 5765usb 13855usb 7415na 9975va 13595am 9985na 5050na 15255va 6090do 13620as 21740pa 5965as 11955as 13755va 7265eu 13620as 17750pa 11945as 13725va								
2200	2210	DRM	Syria, Radio Damascus Canada, Deutsche Welle India, All India Radio 9950eu	9330eu 9800na 9445eu	12085eu 9910pa	2300	0000						
2200	2230	smtwhf	Papua New Guinea, NBC Serbia & Montenegro, Intl Radio Egypt, Radio Cairo Turkey, Voice of Anguilla, Caribbean Beacon Australia, ABC NT Alice Springs Australia, ABC NT Katherine Australia, ABC NT Tennant Creek Australia, Radio 15240pa Canada, CBC NQ SW Service Canada, CFRX Toronto ON Canada, CFVP Calgary AB Canada, CKZN St John's NF Canada, CKZU Vancouver BC China, China Radio Intl Costa Rica, University Network Eq Guinea, Radio Africa Germany, Deutsche Welle Ghana, Ghana BC Corp Guyana, Voice of Malaysia, Radio Namibia, Namibian BC Corp 6060do	9675do 7230pa 9990eu 9830va 6090am 2310do 5025do 4910do 13630as 21740pa 9625na 6070do 6030do 6160do 6160do 7175eu 13750va 15190af 7115as 3366do 3291do 7295as 3270do	12085eu 9910pa 4835irr 15230as 3290do 3290do 6090do 4960do 7120va 9545do 9720as 4915do 3290do	2300	0000	vi	irreg/ vi	vi			
2200	2300	vi	New Zealand, Radio NZ Intl Nigeria, Radio/Ibadan Nigeria, Radio/Kaduna Nigeria, Radio/Lagos Papua New Guinea, Catholic Radio Papua New Guinea, Wantok Radio Sierra Leone, Radio UNAMSIL Sierra Leone, SLBS Solomon Islands, SIBC Taiwan, Radio Taiwan Intl UK, BBC World Service 6195as	15720pa 6050do 4770do 4990do 4960do 7120va 6137do 5020do 15600eu 5965as 9740as	6090do 4960do 7120va 9545do 9575am 11955as	2300	0000						
2200	2300		USA, AFRTS 7590usb 12133usb	4319usb 7812usb 12579usb	5446usb 12133usb 13362usb	5765usb 12579usb 13855usb	2300	0000					
2200	2300		USA, KAIJ Dallas TX USA, KATN Salt Lake City UT USA, Voice of America 15185va 17820va	13815na 15590na 15305va	12140as 17740va	2300	0000						
2200	2300		USA, WBCQ Kennebunk ME 9330na	17495na	5105na	7415na	2300	2330					
2200	2300		USA, WBOH Newport NC USA, WEWN Birmingham AL USA, WHRA Greenbush ME USA, WHRI Noblesville IN USA, WINB Red Lion PA USA, WJIE Louisville KY	5920am 9355va 11765na 9495am 13570am 7490am	9975va		2300	2330					
2200	2300	as	USA, WRMI Miami FL USA, WRMI Miami FL USA, WTJC Newport NC USA, WWCR Nashville TN 12160na	7385am 9955am 9370na 7465na	9985na		2330	0000					
2200	2300		USA, WWRB Manchester TN USA, WYFR Okeechobee FL Zambia, Christian Voice Italy, RAI Intl Croatia, Croatian Radio Libya, Voice of Africa Czech Rep, Radio Prague Intl	6890na 11740va 4965af 11895as 9925na 7320af 7345na	11920na 15770va		2330	0000					
2205	2230	vi					2330	0000					
2215	2230						2330	0000					
2223	2228						2330	0000					
2230	2257						2330	0000					

Nationwide Freqs - Real and Bogus

Recently a question was posted by a newcomer to the *Milcom* newsgroup, hosted by the good folks at qth.net, concerning certain nationwide military air frequency designators. The list he posted contained the following frequencies and designators (Note: the term interplane is used interchangeably with air-to-air).

351.000 Air Force Interplane Common (Haircut)
357.000 Air Force Interplane Common (Magnum)
384.500 Air Force Interplane Common (Pistol)
384.550 Air Force Interplane Common (Pistol Five)

These frequencies with their reported designators have circulated on the internet for years. In fact, they have become part of the fabric of the military monitoring community simply because they have appeared in print, been published on several web sites, or have circulated on frequency lists posted to internet newsgroups.

The unfortunate fact is, none of them are accurate. We have been told that some of them were invented by a few jokers who wanted to have some fun and see how far their hoaxes would circulate in the hobby world. So, here are the four frequencies and an analysis of who is currently using each of these frequencies, based on *real* radio intercepts.

351.000 Air Force Interplane Common (Haircut)
This is an Air Force frequency, but there are no nationwide allocations here. The 1st Fighter Wing/27 Fighter Squadron uses this as a squadron operations frequency, and it has been noted in use by this unit in other parts of the country as well. This is also a Utah Test and Training Range control discrete.

357.000 Air Force Interplane Common (Magnum)
This is an US Navy/US Marine Corps primary assigned frequency. The 102nd Fighter Wing out of Otis has used this as one of their air-to-air discrettes, but that is the only Air Force unit with an assignment here. This was an old VFA-203 frequency before they decommissioned and I was attached to that unit for five years. I never heard any of our pilots use the term "Magnum" in conjunction with 357.000 MHz. Other Navy units VAQ-138, VAW-120 and VT-7 all use this one and maybe one of the training pilots at VT-7 might have used this term at one time, but this is definitely not a USAF nationwide air-to-air.

384.500 Air Force Interplane Common (Pistol)
This is a NORAD tactical in the northeast U.S. Air Force (USAF). AWACS have also been heard here in the southeast U.S. and this is probably a NORAD discrete in these parts as well. I have never seen any fixed wing fighter aircraft air-to-air reported on this one. It isn't a USAF interplane, much less the "pistol" designator supposedly being used in conjunction with the frequency. Scratch another one.

384.550 Air Force Interplane Common (Pistol Five)

Believe it or not, this is actually a real nationwide air-air used by the U.S. Air Force F-15 flight demo team (west). The Cajun gang down at 159th Fighter Wing at NAS New Orleans also uses this one for air-to-air communications. In the many years I was stationed at New Orleans, I never once heard a 159th pilot use the "pistol 5" term relating to this frequency. Again, while this is valid frequency for the units I mentioned above, I doubt the term is in use, if it ever was.

This is by far not a complete list of the frequencies and supposed designators that is in circulation. I have seen much larger lists over the years and I remain as skeptical of them now as I was then.

If you are looking for up-to-date information, I would suggest you order a *Grove Military Frequency Directory* on CD-ROM. It has all the latest information for each base as well as a detailed listing of nationwide military discrete frequencies. You can order it from the Grove website or by calling their toll free number 1-800-438-8155.

❖ Military Nationwide Frequencies

So, do you want some *valid* nationwide frequencies you can program into your scanner? We have included in this edition of *Milcom* a nationwide frequency list you can use, but keep in mind, you have to be patient. You won't find activity all the time on these freqs, but when they get hot ...

Intersquad Radios (Department of Defense)
396.875 397.125 397.175 397.375 397.425
397.475 397.550 397.950 398.050 399.475
399.725 399.925 399.975

89 Military Air Wing Interplane (USAF)
136.725

Air Combat Command (ACC) Command Post (USAF)
311.000 (Primary) 321.000 (Secondary)

Aerial Refueling, Air Combat Command (USAF)
286.000 305.500 319.500 319.700 320.900
324.400 324.600 327.600 336.100 341.400
343.100 343.500 344.700 348.900 352.900
359.100 361.700 366.300 368.600 372.300
375.700 378.200 384.600 388.400 391.800
394.600 396.200

Aerial Refueling, Air Combat Command (USAF) Random Tracks
266.500 275.950 276.100 394.900

Aerial Refueling, Air Combat Command (USAF) Spare/Exercise/Contingency
238.650 264.900 288.900 352.700

Aerial Refueling, Coronet Missions
228.550 236.750 254.600 255.750 268.400
282.000 289.700 293.000 297.300 314.500
322.800 343.100 370.400 372.300 375.700

378.200 388.400 391.000 394.600 396.200

AWACS aircraft voice coordination
225.800 253.800 254.475 261.200 265.900
282.600 288.200 303.100 313.600 320.600

JStars aircraft operations
225.575 225.725 225.975 226.875 227.725
227.925 228.225 228.375 228.750 228.975
231.750 233.750 233.750 235.175 235.325
236.000 236.150 238.350 246.150 252.900
254.475 264.600 271.100 276.800 283.250
283.650 283.850 286.250 308.575 308.850
315.275 316.125 324.650 324.650 341.750
351.025 355.250 372.150 376.150 381.000
387.225 388.225 394.775 395.150 395.825
376.125 388.225

JStars/AWACS Operations
228.050 250.250 276.075 316.300

NASA aircraft air-to-air
123.125 235.400

NOAA aircraft air-to-air
122.925 123.050 304.800

NORAD
228.800 228.900 252.000 254.200 275.000
276.400 276.650 277.600 279.400 282.600
285.900 295.800 298.300 300.125 316.300
328.000 338.400 320.900 362.300 364.200
364.800 387.000

Search and Rescue (SAR)
122.900 123.100 282.800 252.800 259.000
381.000

Space Shuttle Air-to-Ground
259.700

Training Exercises (USAF)
225.450 225.650 225.725 225.850 225.950
226.150 226.250 227.875 227.950 228.050
228.150 228.250 228.475 228.650 228.725
228.850 228.975 229.075 229.275 235.150
236.150 236.550 236.650 238.350

U.S. Coast Guard
237.900 326.150 345.000 379.050

❖ Coast Guard Auxiliary

A little-known civilian volunteer organization supports the efforts of the nation's boating community and the Coast Guard—the U.S. Coast Guard Auxiliary (CGA). We recently discovered that this group's old primary of 143.280 MHz is going to disappear, due to the shift to narrowband within the government radio spectrum. But that change was also bundled with a nice surprise as well: The CGA is getting more frequencies. Here is the list and the band plan they will use with these new frequencies (MHz, mode NFM).

138.475 142.825 143.475 149.200 150.700
143.280 MHz (only through 1 Jan 2008)

150.700/149.200 National repeater pair
143.475 National simplex frequency

138.475 142.825 Additional simplex frequencies
or additional repeater pair

In addition to the frequencies above, we have a few more frequencies below where you can catch USCG and USCGA activity (mode is NFM unless otherwise indicated):

2.182 Distress, Safety and Calling (USB)
2.670 CG Liaison/Working (USB)
3.120 Aircraft HF rotary (USB)
3.123 Aircraft HF (USB)
5.693 Aircraft HF rotary (USB) <Primary>
5.696 Aircraft HF (USB) <Primary>
8.980 Aircraft HF rotary (USB)
8.983 Aircraft HF (USB)
27.980 CG Inland working (AM)
121.500 CG Aeronautical Working: Distress (AM)
122.900 CG Aeronautical Working: SAR training (AM)
123.100 CG Aeronautical Working: SAR working (AM)
156.300 Intership Safety/SAR/Ship to Aircraft <Marine 6>
156.450 Alternate Calling <Marine 9>
156.800 Distress, Safety and Calling <Marine 16>
156.750 Datum Marker Buoy <Marine 15>
157.050 CG Working <Marine 21A>
157.075 CG Working <Marine 81A>
157.100 CG Liaison/Working <Marine 22A>
157.150 CG Working <Marine 23A>
157.175 CG Working <Marine 83A>
237.900 CG Air Operations <Secondary> (AM)
240.600 CG Datum Marker Buoy (Data)
242.650 CG Datum Marker Buoy (Data)
275.100 CG Datum Marker Buoy (Data)
282.800 Search and Rescue (AM)
326.150 CG Air-Ground working <Primary> (AM)
345.000 CG Air Operations <Primary> (AM)
379.050 CG Air-Ground working <Secondary> (AM)

❖ Northeast US Base Update

Our regular reporter from the northeast United States, "the Researcher," recently passed along some new frequencies being used at some of the military bases in the northeast United States.

Burlington Airport, VT

148.5125 Air National Guard Ambulances

Deven Training Area, Ayer, MA

142.950/142.075 DoD PD/MPs (118.8 PL)
143.100/139.200 RFTA Range Control (118.8 PL)

Quonset Point ANGB, RI

141.800/143.800 ANG Security Police (151.4 PL)
148.500 EMS Dispatch
149.475 ARFF Fire Net
406.8625 Disaster Medical Assistance Team <F1>

Westover JARB, MA

139.2375/150.2125 Civil Engineering Net
140.8875/149.2875 Fire Department <F2> Also noted with 140.8875 talk around (P25)
173.5625 Base Clinic
412.8375 Disaster Medical Assistance Team MA-2 repeater output/simplex (141.3 PL)
413.200 Civil Engineer training

❖ FAA ARTCC Frequency List

In this month's FAA Air Route Traffic Control Center report we are going to take a look at the Washington and New York Centers. For the background on the Air Route Traffic Control Centers, see the June 2005 issue of *MT*.

So, until next month, 73 and good hunting.

Table One: ARTCC Frequency List

Washington ARTCC

Bucks Elbow, VA	121.675/284.700	High Discrete
	133.200/282.200	Low/High: Approach/Departure services
	133.275/371.900	High
	135.400/263.100	Low Discrete: Approach/Departure services
	296.700	Low [Amber 04]
Buena Vista, VA	127.925/317.700	Low/High Discrete: Approach/Departure services
	133.025/319.000	High
	134.400/353.900	Low Discrete: Approach/Departure services
	134.625/377.200	High
Cape Charles, VA	128.525/275.700	High
Cedar Lake, NJ	124.775/362.300	Low/High
Elkins, WV	128.600/387.100	Low Discrete: Approach/Departure services
Falls Church, VA	126.875	High
	132.775/351.800	High
	133.975/381.500	High
	135.525	High
Grantsville, MD	133.650/285.600	Low Discrete: Approach/Departure services
Green Bay, VA	118.750/377.100	Low Discrete: Approach/Departure services
	127.750/380.300	Low: Approach/Departure services
	132.025/269.400	High: Approach/Departure services
	133.725/351.900	High
Hagerstown, MD	134.150/385.400	Low/High Discrete: Approach/Departure services
Johnsonville, NC	135.200/348.650	Low Discrete
	118.925/322.450	High
Linden, VA	120.650/319.100	Low Discrete
Lynchburg, VA	133.575/270.350	Ultra High
Manteo, NC	124.725/350.350	Low: Approach/Departure services
Martinsburg, WV	132.275/379.300	Ultra High
Millville, NJ	125.450/363.000	Low/High
Modena, DC	132.525/287.900	Low Discrete
New Bern, NC	118.825/360.650	Ultra High
	135.500/272.750	Low Discrete: Approach/Departure services
	256.700	High
Patuxent River, MD	133.900/281.400	Low Discrete: Approach/Departure services
Roanoke, VA	134.625/377.200	High
Rocky Mount, NC	132.225/354.100	High
	135.300/285.500	Low Discrete: Approach/Departure services
Sampson, NC	118.475/279.650	High Discrete
Sea Isle, NJ	127.700/285.400	Low Discrete: Approach/Departure services
	133.125/278.500	High
Ship Bottom, NJ	127.025/254.300	High
Smyrna, DE	132.050/277.400	Low: Approach/Departure services
Snow Hill, MD	132.550/256.800	Low: Approach/Departure services
South Boston, VA	124.050/307.000	Low Discrete: Approach/Departure services
Whaleyville, NC	123.850/323.000	Low Discrete: Approach/Departure services
	127.425/387.050	Ultra High
	128.525/398.850	Ultra High
	133.825/327.800	High
	258.100	High
	296.700	High [Amber-04]
White Sulphur Springs, WV	120.850	Low: Approach/Departure services
Wilmington, NC	124.025/269.150	Low/High Discrete: Approach/Departure services
Unknown RCAG	120.375 134.025 134.500 257.700 269.300 281.450 317.500 327.000 360.700 377.650	

New York ARTCC

Barnegat, NJ	132.150/354.000	High Discrete
Barnstable, MA	125.925	High Oceanic
	135.800	High Oceanic
	284.750	High Oceanic
	381.600	High Oceanic
Big Flat, PA	132.200/322.400	Low Discrete
	133.475/270.300	High
Colts Neck, NJ	118.975/307.800	Low
Douglaston, NY	133.050	High
	134.375	High
Elk Mountain, PA	128.500/290.400	Low
	132.175/298.900	High: Approach/Departure services
	134.450/363.200	Low Discrete
Flint Hill, PA	124.625	Low
	132.100	Low
	134.600	Low
	278.300	Low
	290.200	Low
	339.800	Low
Huguenot, NY	132.600/285.500	Low
Joliet, PA	132.500	Low
	133.675	Low
	239.050	Low
	322.500	Low
Matawan, NJ	125.325/282.300	High Discrete
	127.175/350.300	High
Millville, NJ	134.325/381.450	High
	323.300	High
Modena, PA	135.450/335.600	Low
Nantucket, RI	121.125	High
North Mountain, PA	121.325	High
	123.625/279.500	Low Discrete
	128.575	High
	133.500/282.350	Low
	269.100	High
	273.600	High
	364.800	High [Amber-03]
Philipsburg, PA	132.875/306.200	High
	134.800/338.300	Low Discrete: Approach/Departure services
Sayre, PA	133.350/372.00	Low Discrete: Approach/Departure services
Ship Bottom, NJ	128.300	Low
	133.050	Low
	307.800	Low
	353.500	Low
Sparta, NJ	133.150	Low
Williamsport, PA	124.900	Low
Unknown RCAG	343.725 390.950	



Monitoring the FBI (or trying to)

The Federal Bureau of Investigation has long been a favorite monitoring target of scanner listeners. Yet, despite having one of the largest radio communications networks in the United States, they can be an elusive catch.

Part of the Department of Justice, the FBI currently operates the largest civilian land-mobile radio system in the United States, with over 35,000 mobile or hand-held radios and over 4000 antenna or repeater sites across the country. Even with this vast radio network, the FBI communications can be difficult to monitor for many reasons, including their early adoption of digital encryption.

Due to the sensitive nature of the FBI's work, the agency's radio communications are encrypted throughout most of the country, with some exceptions. So why bother to listen to FBI channels if they are scrambled?

Even with the use of encryption, FBI frequencies will sometimes come to life in clear, analog mode. Major metropolitan areas have one or more FBI frequencies that are dedicated to bank robbery alerts and other major incidents and these are often broadcast in the clear. Also, radios can lose their encryption key and will not operate in the "secure" mode. It's believed that the FBI changes encryption keys quite often, sometimes once a month. When that happens, they seem to switch everyone to unencrypted, analog mode for a day or two until they get everything coded again.

Back in the 1970s (the beginning of my scanning career), I first stumbled onto the frequencies used by the FBI. In those days, the FBI's repeaters were on frequencies between 163.8125 MHz and 163.9875 MHz, with their input frequencies and simplex channels between 167.0125 MHz and 167.9875 MHz. In those days before cell phones, monitoring was very interesting, with many surveillance and other operations heard regularly.

In the late 1980s the FBI began a major rebuilding of their radio communications network, which included voice scrambling using DES or Digital Encryption Standard as part of the new system. This kept all the radio communications private. Many scanner listeners simply quit monitoring the FBI channels after this because of the annoying noise of DES encryption.

Around the time that the DES encryption came into use, the FBI began to move all their frequencies around, putting the repeater outputs on the 167 MHz frequencies and the inputs on the 163 MHz frequencies. These repeater sites were often connected via UHF control links in the 406-420 MHz band, but those seemed to have disappeared in the mid-to-late 1990s and were most likely replaced with microwave, dedicated phone lines, or fiber connections.

Unlike some other federal agencies, the FBI does not have a standard channel plan for the entire country. Because of this, providing a list of city-specific FBI channels would take up this entire issue of *Monitoring Times*! FBI frequencies do generally fall into specific areas in the VHF federal spectrum. Start by searching in these areas of the federal VHF band:

162.6125 – 164.5000 MHz
165.5125 – 165.9000 MHz
167.1000 – 167.9000 MHz
168.8250 – 169.9750 MHz
170.6250 – 170.9500 MHz
173.0000 – 173.2000 MHz

Remember that frequencies used by the FBI are not limited to these groups, and tactical channels can be found scattered throughout the VHF federal band. Besides these groups of frequencies, some listeners have reported hearing FBI communications on frequencies between 139 MHz and 150 MHz, something I have never confirmed.

When the FBI transmissions are analog and "in the clear," you will almost always find that they use a 167.9 CTCSS squelch tone. A trick used by some monitors is to program the tone in each of the FBI frequencies or to search on the tone. By doing this, you not only won't have to listen to the DES encryption, but you will pretty much know who you have when it hits.

Even without a national channel plan, FBI radios all reportedly have a bank or zone of nationwide channels, so that the agents can travel outside their home areas and still have communications. Most frequency lists refer to this as the **D Zone**, as follows:

D1 OCDEF* (repeater)	164.5500 MHz, 167.9 pl (168.8625 MHz in)
D2 OCDEF (simplex)	164.5500 MHz, 167.9 pl
D3 DHS & Treasury Common	166.4625 MHz, 100.0 pl
D4 FBI Common	167.5625 MHz, 167.9 pl
D5 Special Ops Group	167.5375 MHz, 167.9 pl (163.8625 MHz in)
D6 Special Ops Group (simplex)	167.5375 MHz, 167.9 pl
D7 Federal Common	163.1000 MHz
D8 National Law Enforcement	155.4750 MHz

*OCDEF stands for Organized Crime and Drug Enforcement Task Force. Formed in 1983, this is a nationwide, multi-agency task force that

combines the FBI and other federal agencies. You can learn more about the OCDEF at <http://www.usdoj.gov/criminal/ocdef.html>

Besides federal frequencies, FBI agents also have access to local or state law enforcement agency radio systems. Before the national frequency records were classified in 1983, the NTIA listed FBI allocations on nearly every state police frequency and many large city police frequencies. Today, many 800 MHz trunked systems used by city, county or state agencies often have talk groups allocated to the FBI and other federal agencies. There are also procedures in place that allow the FBI to use VHF aero-band channels for incidents involving aircraft terrorism.

The FBI land-mobile systems are now undergoing some major changes as they switch to the required narrow-band digital radios. With these changes will most likely come some new frequencies and new channel plans. E.F. Johnson has acquired a large contract to provide APCO P-25 digital radios to the FBI, so keep a sharp ear out for formerly DES encrypted channels suddenly becoming APCO-25 digital.

The FBI is also a big user of the HF or short-wave spectrum. FBI field offices from all over the US are regularly monitored doing ALE (Automatic Link Establishment) soundings on their HF channels. Here is a great list of FBI HF frequencies and stations, courtesy of the *Grove Shortwave Directory* with some additions by Ron Perron; all frequencies are in kHz, USB mode.

FBI on HF

2808.5 4991.0 5058.5 5388.5 7778.5 7903.5
9183.5 10913.5 11073.5 14493.5 14532.5
15953.5 18171.0 18666.0 19344.5

FBI ALE Identifiers Used:

AN1	Anchorage AK
AT1	Atlanta GA
BA1	Baltimore MD
BI1	Birmingham AL
BF1	Buffalo NY
CL1	Cleveland OH
CO1	Columbia SC
DL1	Dallas TX
DN1	Denver CO
EP1	El Paso TX
HO1	Honolulu HI
KC1	Kansas City KS
KW1	Key West FL
LR2	Little Rock AR
LV1	Las Vegas NV
ME1	Memphis TN
MM1	Miami FL
NF1	Norfolk VA
NY1	New York NY
QT1	Quantico VA
QT2	Quantico VA
QT5	Quantico VA

QT10 Quantico VA
RH1 Richmond VA
SA1 San Antonio TX
SE1 Seattle WA
SI1 Springfield IL
SJ1 San Juan PR
SL1 St Louis MO
WF1 Washington DC Field Office

❖ NASA Update

Here is an update to part of the outstanding NASA frequency list by Larry Van Horn in the May issue of *Monitoring Times*. I recently found some changes had taken place to the communications systems used at the Johnson Space Center in Houston. For years, JSC has used a mixed collection of VHF and UHF repeaters and simplex channels. Other frequency lists have shown a possible UHF federal trunked radio system for JSC, but that system never existed until just a few months ago. Budget cutbacks at NASA made the trunked system a low-priority item, but I suspect that new Homeland Security grants and concerns about security at federal installations accelerated the plans for this new system.

The first indication that something was up occurred about a year ago, when the JSC Security operations moved to some APCO P-25 digital radios on conventional UHF channels. Other NASA operations at JSC remained on VHF & UHF conventional frequencies until early this year. In April 2005, I began to see reports of a new UHF trunked system control channel coming from the Southeast Houston area.

After monitoring the control channel for a few days, I was able to determine that it is a Motorola Smart Zone system, with an ID of B32C. All the system activity was P-25 digital with encryption, so no talk groups could be identified. I am fairly certain that nearly all NASA radio users have moved over to this new system, as the conventional VHF/UHF channels were completely silent while I was monitoring. Also, there are quite a few active talk-groups on this new trunked system, many more than would be needed for normal security operations.

Here are the frequencies used by this new system:

Johnson Space Center trunked system
406.2375 MHz - Control Channel
407.0375 MHz
407.2375 MHz
407.4375 MHz
407.6375 MHz
408.5500 MHz
409.5125 MHz - Formerly JSC Security, conventional P25 encrypted
409.7125 MHz
409.9125 MHz

Information about this system is also available at the Radio Reference web site <http://www.radioreference.com/modules.php?name=TRSDB&sid=3997>. This site lists an additional frequency used by the trunked system, 406.8375 MHz, but it was not in use while I was monitoring. The system is currently labeled as "Unidentified Federal System," but some on-location monitoring pinpointed the transmitter location as being on the grounds at the Johnson Space Center.

Why would NASA feel the need to encrypt

everything on this new system? I suspect that someone involved in the planning and implementation of the project simply took the federal government's mandate that all newly purchased digital radios must be capable of encryption to the ultimate conclusion. Some good news – despite all the encryption, NASA Public Affairs continues to broadcast mission audio from JSC on 171.150 MHz as they have for years.

❖ Searching New York City

There is a big difference between scanning your local public safety radio systems and scanning federal frequencies. I like to compare federal listening to hunting for treasures at a flea market. You can spend a lot of time looking and not finding what you are looking for in a flea market, just as you can spend a lot of time scanning your known local federal channels and not hearing anything.

The most important thing is to keep searching. I realize that a lot of scanner users have only one or, if they are lucky, two scanners they use for listening. But if you can devote at least one radio to searching small parts of the federal frequency bands, I am certain that you will eventually find something new.

Here's a federal searching tip I've used for a few years. Try searching your target frequencies early on weekday mornings. It seems that a lot of federal agencies like to work a 7 – 4 shift and they usually check in with base or chat about traffic on the way in to work. I almost always hear some federal radio action around 6a.m. to 8a.m. on weekdays.

I often see comments on scanner forums and mail lists that all federal communications are "scrambled" so you can't hear anything – Not true. Even with the move towards narrowband and digital radios, there is still a lot out there to hear. I recently spent some time in the New York City area and found a surprising amount of analog federal traffic as well as some P-25 digital traffic, with only a few frequencies using encryption full time. Here are some of the active frequencies I found just by searching:

NYC logs

163.1750 Coast Guard
164.1875 United Nations Security
164.3375 US Postal Service, Brooklyn Truck Operations
164.4000 Secret Service PAPA
164.9125 Coast Guard, Main Freq for NYC & Harbor Operations
165.2375 CBP NET 1
165.2875 ATF NET 1
165.3750 Secret Service CHARLIE
165.4250 VA Cemetery
165.4875 ICE Aerial surveillance
166.3250 US Park Police, Gateway National Recreation Area
166.3750 USPS, Truck operations NYC
166.4625 DHS Common
166.6375 US Park Police, Ellis Island
166.8875 United Nations Security
166.9000 National Parks Service, Fire Island National Seashore
166.9250 US Park Police, input to 166.3250
167.1250 USPS, New Jersey Trucks
167.1500 FBI
167.3875 FBI, Connecticut
168.3500 Federal Interoperability
168.3500 USPS, Trucks in New York City
168.5500 NPS, Gateway National Recreation Area Maintenance

168.9750 FBI, New Jersey
169.1125 USPS, Long Island
169.4000 NPS, Sandy Hook NJ
169.4125 CBP, Customs JFK Airport
169.4500 CBP, Customs NET 2
169.9750 FBI, Newark NJ
170.1250 USPS Trucks NJ
170.5500 FBI
170.6250 FBI
170.7750 USPS New Jersey
170.8250 FBI
171.0000 USPS Maintenance
171.2375 HEW NY Office
172.3250 FBI
172.4250 FBI
172.9000 DHS-TSA
408.1000 Department of State Security Details
409.0250 USPS trucks Queens
409.6250 Department of State Security Details
414.7500 USPS Postal Inspectors RED
416.2250 USPS Postal Inspectors GREEN
417.2000 DHS Federal Protective Service
418.9500 DEA

Do a little searching with your scanner and let us know what you hear!

Looks like that's it for another edition of *Fed Files*. See you in a couple of months!

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The Detroit & Mackinac

In this issue we will discuss Michigan's Detroit & Mackinac Railroad, which is today's Lake States Railway in northeastern Michigan. We will give details on a computer website called railroadradio.net where a person can listen in to railroad radio communication via the Internet. We will also discuss signal skip, dual-frequency hot-box detector transmissions, and a new technology called "Voice Train Reporting."

When spring finally came this year, we did a lot of yard work and little train watching. But in late May we drove north to Rogers City, Michigan, to see my mother-in-law and relax for a week. The old Detroit & Mackinac Railway served this town by hauling calcite from the mine and plastic pellets to the plastic plant on the south side of town.

At Posen Junction, the tracks used to head northwest through Posen, Hawks and on through Onaway. Numerous branches used to radiate from the Onaway area to the back woods lakes area. In one infamous event in the early 1900s, a forest fire swept a passenger train filled with children on their way to summer camp and killed many of the tourists.

However, the railway no longer comes to Rogers City, and the tracks to Rogers City and Posen were torn out three years ago. The tracks from Posen to Onaway were removed many years ago. In many areas where the tracks are torn out, the old right-of-ways are being used as snowmobile trails.

Today the railroad is called the Lake States Railway. The railroad has its main yard in the Bay City, Michigan, area with two main routes. One route runs northwest through St. Helens and on through Grayling where it serves some lumber industries. The line now terminates at its yard in Gaylord, Michigan. The other route follows the Lake Huron coastline and now ends at the engine facility and yard in Alpena, Michigan.

Lake States Railway uses all locomotive power manufactured by Alco (American Locomotive Company) from Schenectady, New York. Newer power is from the Canadian National Railway in Canada but it was manufactured by Montreal Locomotive Works under license from Alco.

Their ancient Alco RS-3 locomotive services the LaFarge Cement plant in Alpena. The Alco RS-3 #469 is parked off the spur to the LaFarge Plant by the enginehouse. It was a sunny day that I took this shot. This engine is probably 55 years old and still operates every day. I am not certain where the LSRy bought this engine. It is



still in the paint scheme of the previous owner.

The Lake States Railway uses 161.310 MHz for their general operating channel. I have heard them on the radio switching on this radio frequency. The railroad is also licensed to use 161.280 MHz for their switching operations.

The railroad operates two road trains a day, plus switching runs around the Bay City area. Two trains each Monday leave the Bay City Yard with one heading to Gaylord and the other to Alpena. They run north one day and south the next. The railroad carries mostly wood and cement products.

❖ Railroad Radio.net

VHF railroad band radio transmissions normally travel a distance equal to your line-of-sight. However, although I live just north of Fort Wayne, Indiana, I sometimes enjoy listening to the Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) on the Joint Line in Colorado!

Just how do I do that? It is really easy with a computer, internet connection and the necessary sound card and speakers. Just go to <http://www.railroadradio.net> where people all over the country feed their local signals into the website. The "Live Railroad Radio Communications" discussion area has further assistance with announcements concerning the audio feeds and

has technical support for the streams.

Below are the audio streams that are typically available on a daily basis.

BNSF/UP Auburn, WA area
BNSF Chicago, IL
Bakersfield/Tehachapi, CA
BNSF Seattle/Everett/Stevens Pass, WA
BNSF/UP Tacoma, WA area
BNSF Gateway Sub, CA
BNSF/UP Colorado Joint Line
BNSF St. Louis, MO
BNSF Stampede Pass, WA
BNSF Stockton Sub, CA
BNSF/UP/Metrolink Los Angeles (Inland Empire), CA
BN/UP/Metrolink, Los Angeles, CA
Caltrain, SF Peninsula, CA
Central Oregon & Pacific (CORP)
Elgin, Joliet & Eastern, IL
Hebron, ME
CXS P&A Sub, Crestview, FL
CSX PD Sub, Pensacola, FL
CSX Cumberland Sub, WV
CSX M&M Sub, Foley, AL
CSX/NS Chattanooga, TN
CSX/NS Decatur, AL
CSX Fostoria, OH
MRL/BNSF Billings, MT
NS Harrisburg Line, Harrisburg, PA
NS Harrisburg Line, Reading, PA
NS Pittsburgh, PA
Southeastern Minnesota
Spokane, WA
Twin Cities Minneapolis/St. Paul
UP Roseville, CA
UP San Francisco Bay area
Vancouver, BC
Vancouver/Columbia River area, WA

The audio streams into your computer and plays through your speakers using either Real Audio or Microsoft MediaPlayer. You can download RealAudio from <http://www.RealAudio.com> free of charge. MediaPlayer should be loaded with Windows XP.

There is a slight delay while listening to the various links. Since the broadcasts are not real time, use care when using this information.

Enjoy using this tool. If you cannot travel, you can have fun listening to the rail traffic on distant trackage. I used to live in the Denver, Colorado, area, so am familiar with the Joint Line. That is one of the reasons I listen to that link. Another reason to enjoy listening to some western railroad action is because the BNSF Railway and the Union Pacific do not operate in Indiana. Then there's my railroad buddy Mike who works for the railroad in Minneapolis: using railroadradio.net I can tune in and listen to the same railradio traffic that he does.

❖ Signal Skip

As I write this column on a sunny and very muggy/humid Saturday morning in mid-summer, I have my scanner running in the background. Weather conditions such as this sometimes make the line-of-sight very high frequency (VHF) radio signals travel greater than normal distances. Tropospheric ducting can cause some of this phenomenon. VHF signals do not bounce off the atmosphere like high frequencies (HF) do. But, with weather conditions like this, VHF signals have traveled from 100 to 1000 miles away, bringing some great listening.

This morning I am listening to a railroad make deliveries to Honda in Marysville, Ohio, and was just listening to the Chicago, South Shore and South Bend commuter engineer say she was leaving South Bend Station with a standing room only train. All sorts of distant signals may roll in on a humid morning. Listening like this is really thrilling with so many distant signals being received.

Since you never know where the signals may come in from, be sure to program in all 91 U.S. VHF railroad channels into your scanner and monitor all channels on these humid summer days. There may be great listening in store.

❖ Hot-box Detector

Around June 10, I began to hear two Norfolk Southern hot box detectors (HBD) east of Fort Wayne, Indiana, transmit their messages to the crews on two different frequencies. One voice reported the train condition on the 160.380 MHz road channel, while another voice relayed the same train report on radio frequency 160.950 MHz.

Radio frequency 160.380 MHz is used at the East Wayne Yard Terminal channel, so due to heavy traffic the report may be given simultaneously on a new and clear frequency. The HBDs are at Mileposts 118.4 and 135.3 on the Huntington Division tracks northeast through Butler, Indiana.

Be sure to report changes to any HBDs in your area, too. Listening to these reports is a good way to learn when a train may be coming your way!



The radio on board this BNSF Railway locomotive can be used to access the VTR voice recognition system when the locomotive is on home rails.

❖ Voice Train Reporting (VTR)

The Burlington Northern & Santa Fe Railway in Texas is now using Voice Train Reporting and you can listen in to their conversations in that part of the country. ScanSoft Speech System Deployments is the company which developed this technology. The BNSF system improves worker efficiency and utilizes speech in a creative, automated solution to communication issues in running their railroad.

This system allows field personnel to report their train arrivals, pick-ups, departures and setouts via their MRAS (Mobile Radio Access Systems) or via cellphone. This is all done via voice recognition, providing the customer with more real-time information.

Since people already know how to talk, the system is intuitive and does not require extensive training. The entire operating instructions are printed on a small card the crew carries with them. The instruction is self-explanatory, and the learning curve is short and easy.

The foremen and conductors on the BNSF register for the VTR system by dialing in from any land-based phone. This registration process will match their employee number with their

voiceprint. It allows them to access the VTR application and report the work being completed.

The BNSF operates in 28 states and two Canadian provinces, and uses this system from locomotive cab radios. The voice recognition data is then translated into the railway's computer system.

SpeechWorks, a division of ScanSoft, has honored the BNSF Railway for their progressive use of speech recognition in their daily operations of a 30,000-mile Class 1 railroad.

Mobile Radio Access Systems telephone frequency listing

160.245/161.490	MRAS P-1
160.245/161.535	MRAS P-2*
160.260/161.490	MRAS P-3*
160.335/161.460	MRAS P-4*
160.425/161.295	MRAS P-5*
160.335/161.295	MRAS P-6
160.830/161.490	MRAS P-7
161.085/161.280	MRAS P-8
160.425/161.295	MRAS Mt. Diablo, CA

* MRAS locations in Texas

This concludes the railroad column for this edition. Be sure to send information you may have concerning news on railroad radio and any railroad radio frequencies you may wish to share with our readers.



BNSF #9579 is an EMD SD70MAC and also has the radio equipment on board to use the VTR system when on home rails in Texas.

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One-Watt Wonders

Not all longwave beacon signals originate from expensive commercial installations. At the other end of the scale is a small but significant group of ham-like experimenters who inhabit 160 to 190 kHz (1750 meters). On this band, low power, homebrew equipment is the order of the day. The LOWFERS (Low Frequency Experimental Radio Stations) work against some pretty tough odds to get their signals heard.

These unlicensed, yet legal stations operate under an obscure provision of the FCC's Part 15 Rules – Subpart D. In essence, this section allows the license-free operation of a 1-watt input transmitter as long as the antenna does not exceed 50-feet/15 meters and any out-of-band emissions (harmonics, spurs, etc.) are kept at least 20 dB below the fundamental carrier.

At first, a 50-foot/15 meter antenna may sound pretty generous, but at these low frequencies it's like using a paper clip on the 20-meter ham band. Despite these severe power and antenna restrictions, many Lowfers report fairly regular contacts of 300 miles or more.

It used to be that almost all Lowfer operation was restricted to the east and west coasts of the U.S. The coasts still hold the majority of activity, but more and more inland activity is being heard today. There are also some Lowfers in Canada operating under special permits. In addition, it's worth mentioning that many stations operate on the nearby 136 kHz band under various rules and special permits. It's worth a listen there, too. (This frequency is a licensed ham band in several European countries and elsewhere.)

Most Lowfer operation is conducted

beacon-style. A typical transmission consists of the station's call sign followed by QSL information or other station details, repeated over and over. If you're lucky, you may also hear some two-way contacts on the band. An adventurous group in the Burbank, CA, area has been running voice (SSB) nets on this band Sunday mornings for some time.

Until the mid-1990s, the most common mode used on 1750 meters was standard (keyed carrier) Morse Code. Morse is still used today, but a weak-signal mode known as QRSS has become the mode of choice for many serious operators. To receive QRSS, you'll need a PC with a soundcard and specialized software such as ARGO. This mode is basically super-slow CW that takes advantage of the extremely narrow receiving bandwidths that can be used for slow data rate transmissions. To learn more about QRSS, and to download ARGO software, visit <http://www.qsl.net/padan/argo>.

❖ When to Listen

As for operating schedules, many beacons operate 24 hours a day so you can try for their signals at any time. Some stations operate on a more limited basis such as weekends, evenings or by special request. As with NDB listening, nighttime provides the best chance for DX, but there have been many cases of enhanced daytime propagation. My best Lowfer intercept was made at 10 a.m.

Because no license is required, Lowfers create their own call signs. Usually, it's made up of the operator's initials or the suffix of a ham call. You can find a fairly complete listing of stations online at <http://www.lwca.org/sitepage/part15/index.htm>. You stand a good chance of hearing at least one of these stations if you are in the general vicinity.

❖ Tips for Better Reception

When tuning the band, be patient and remember that you're trying for signals that are running flea power as compared to commercial NDBs (non-directional beacons). As such, interference from light dimmers, power lines, motors, etc. can combine to wipe out a Lowfer signal that might otherwise be readable. Try to shut off potential interferers before you begin listening.

Always use a good set of headphones. This will enable you to concentrate more

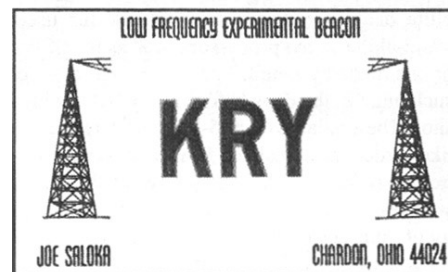


Figure 1. A QSL from Lowfer KRY, Chardon, OH.

on the signals of interest and block out surrounding household noise. If your receiver has a selectivity control, use the narrowest setting available when hunting for Lowfers. A narrow passband will help reject signals on nearby frequencies that could cause interference to your target.

The receiving antenna is also a critical part of your system. A "longwire" antenna can be used in quiet areas, but in most cases you'll do better with a loop or active antenna designed for LF work. Their physical sizes are small, making them less likely to be "noise collectors" as compared to longwire antennas.

❖ QSLing a Lowfer

Lowfers are always happy to receive reception reports from listeners. If you hear a Lowfer and don't have the station's address, drop me a postcard or e-mail and I'll try to help. For many listeners, a Lowfer QSL is the most highly prized longwave verie.

❖ Learning More

Do you want to know more about the Lowfer band? An excellent place to begin is the Longwave Club of America's website at <http://www.lwca.org>. From here, you'll find links that will take you as far as you want to go, including setting up your own transmitting station. Membership dues for the Longwave Club of America include the acclaimed "Lowdown" journal, and costs \$21.00 a year in the United States (\$24 for delivery in an envelope), \$21.00 a year to Canada, and \$26.00 per year elsewhere. Remit all dues in US funds to the publisher, Bill Oliver, at: The Longwave Club of America, 45 Wildflower Road, Levittown, PA 19057.

That wraps it up for September. 73, and best longwave DX!

Longwave Resources

✓ **Sounds of Longwave** 60-minute Audio Cassette featuring WWVB, Omega, Whistlers, Beacons, European Broadcasters, and more! \$13.95 postpaid

✓ **The BeaconFinder** A 65-page guide listing Frequency, ID and Location for hundreds of LF beacons and utility stations. Covers 0-530 kHz. \$13.95 postpaid

Kevin Carey
P.O. Box 56, W. Bloomfield, NY 14585

Florida Law Criminalizes Pirates

The state of Florida, long a hotbed of local FM pirate activity, has passed a state law making pirate radio operation a criminal offense. At the end of June, according to numerous press accounts, state law enforcement officials made their first criminal arrests under the new law. The Florida Department of Law Enforcement arrested Marquis McDonald and Rasheem Oriley in Fort Lauderdale. McDonald and Oriley were charged with "unauthorized transmission of a radio station." Their pirate operation, **WKPX**, had broadcast on 88.5 MHz prior to the criminal arrest. Station equipment was confiscated during the arrest.

The incident reminds us that unlicensed pirate radio operation is not authorized by federal law. The new wrinkle in the **WKPX** case comes from the state criminal charges. However, during the bust of the station, Florida authorities undermined their own credibility by claiming that the pirate station had the potential to endanger the public by interfering with aircraft communications. No such interference was alleged during the arrest, but these highly questionable claims were made on a widespread basis in local newspapers and on Fort Lauderdale television.

❖ Radio Free Brattleboro Raided

In a second high profile pirate bust during late June, the FCC obtained a warrant from a Burlington, Vermont, federal judge. This ten watt local community FM pirate, which had been on the air since 1998, was busted by the federal marshalls. Station equipment was seized, and the station abruptly left the air.

Litigation continues in this matter, with a significant amount of local community support for **Radio Free Brattleboro**, including a landslide of support in a local election referendum. The *Brattleboro Informer* newspaper reported that both the FCC and radio station personnel and lawyers are considering this litigation to be a "landmark case."

❖ Corsair Transmitter Again

Our coverage of the Corsair transmitter in July generated numerous inquiries to *MT*. This innovative AM transmitter fits entirely into a metal box the size of an Altoids mint tin. Both licensed ham radio operators and pirate radio operators have an intense interest in this new QRP low power transmitter design. In fact, there is so much interest that the web site we cited in *MT* is sometimes shut down because it receives too many hits. Therefore, be patient while checking the web site.

In the public interest we'll repeat the URL and add an alternative site. Both sites contain information on how to build one, including the schematic diagram. Try either <http://www.geocities.com/radio107mhz/> or http://www.geocities.com/thecorsairtx/The_Corsair.html. The second URL also contains off-air recordings made from the transmitter in use, as well as considerable additional information about this extremely interesting transmitter design.

❖ Radio Hoa-Mai

A quasi-clandestine has emerged that is targeted to Vietnam, with an identification of **Radio Hoa-Mai**. At press time their schedule was 11555 kHz for a half hour at 1330 UTC. They promise schedule and program information and other updates at their Vietnamese language web site, found at <http://www.radiohoamai.com/> on the internet. We see a photo here of Nguyen CongBang from the coordinating group of the Hoa-Mai Club, an expatriate Vietnamese group that operates this station. The club's station calls for a "free and fair" election in Vietnam.



If you have reception reports, you can send them to Nguyen CongBang at his congbang@nvnp.org e-mail address, or you can use the station's own address at radio@hoamai.org. If you prefer postal mail, their address is PO Box 4175, Garden Grove, CA 92842 in the USA. The transmission actually emanates from airtime bought at **KWHR** in Hawaii.

A different Vietnam clandestine operation called **Little Saigon Radio** broadcasts via syndication on various USA medium wave stations, and is also available via streaming audio at their <http://www.littlesaigonradio.com/new/> web site. They use 11540 kHz for a half hour at 1130 UTC for a shortwave service, allegedly via transmitters in Taiwan.

❖ WTOU

A licensed radio station on 1350 kHz in Akron, OH, fooled some people when it switched from Fox Sports to a Liberal Talk Radio format in June. A promotional campaign for **WTOU** implied that it was a pirate radio operation. But, despite the **Free Radio Ohio** web site that it retains today at <http://www.radiofreeohio.org/> on the internet, the station remains fully licensed. Its Clear Channel corporate ownership is the same as **WKDD-FM** in Akron.

❖ What We Are Hearing

Monitoring Times readers heard a baker's dozen different North American pirates this month. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regular announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. You sometimes have to tune your dial up and down through the pirate radio band to find the stations, but the primary North American pirate frequency of 6925 kHz, plus or minus 30 or 40 kHz, remains the best place to scan for the pirates.

Grasscutter Radio- Rock music and pirate radio advocacy are their normal format. From time to time they do a "joint broadcast" with **Sunshine Radio**. (Uses grasscutterrado@yahoo.com e-mail)

KAMP- Station operator "I Am Nutz" has been verifying reports lately with QSLs, so you might want to send in a letter. (Blue Ridge Summit)

Pirate Radio Boston- This rock music programming normally has a Boston focus. (Uses pirateradioboston@yahoo.com e-mail)

Radio Free Euphoria- Captain Ganja promotes marijuana, as his name implies, but he mixes in some good pirate comedy with the drug material. (Belfast)

Sunshine Radio- Their rock music is hosted by a female announcer, an unusual circumstance on the pirate bands. (Uses the address from Grasscutter Radio; grasscutterrado@yahoo.com e-mail)

Take it Easy Radio- Their signature tune is by the Eagles, of course, but they normally feature other rock music, too. (Merlin)

The Crystal Ship- The Poet still shows up with rock and political commentary on unpredictable frequencies including 6854, 6875, 6925, 7335 (sic), when **CHU** was off, 7545, 8000, and 9057 kHz. (Belfast and uses tcsshortwave@yahoo.com e-mail)

Undercover Radio- Dr. Benway announces that his rock music shows come "from the middle of nowhere." Their other slogan is "don't tell them what we are doing." (Merlin and uses undercoverradio@mail.com e-mail)

Voice of Laryngitis- Farty the Seal's barking has always been this station's interval signal, but he now barks to the tune of "Smoke on the Water." (Belfast)

WHGW- Digital mode broadcasts and Morse Code IDs have been added to their old time radio show rebroadcasts on a regular basis. (Uses whgw6925@myway.com e-mail)

WHYP- James Brownyard's weather reports for Lake Erie cities from North East, PA, are several years late, but they are mixed with pirate comedy and relays of other pirate shows. (Providence and uses whypradio@gmail.com e-mail)

WMPR- The "Dance Party" rock music format is still heard from this one, even though you can't write to them. (None, has QSLed only at the Winter SWL Festival)

Yosemite Sam- Little is known about this new one, which mixes rock with a slogan of "Hey, you're a rabbit, and I'm gonna drill you dead." (None)

continued on page 61

Back to School Reading

It's been quite a few years since I participated in formal education. But most of us can recall how September usually signaled the beginning of the school year. Be it a young person going to a local school or a young adult heading off for college (or someone like me who kept on doing graduate work into my 30's), September was always a time for getting acquainted with a new stack of books. Sometimes I still long for those hallowed halls of academia. However, I don't miss that low performing slinky dipole I had strung in my basement dorm.

So, in that spirit of cracking open a new book or two, I've decided to take a look at a new publication and a couple of new CD-Rom based software packages that have come around this fall for ham radio hobbyist's enjoyment.

Let's start things off with a diminutive book that should be in the shack of every ham who operates anywhere around 28 MHz.

The ARRL Repeater Directory
2005-2006 Edition (34th Edition)
Edited by Steve Ford WB8IMY
648 Pages
\$10.95

ISBN: 0-87259-942-6

ARRL Order #9426

The American Radio Relay League
225 Main Street, Newington, CT 06111-1494

1-888-277-5289

<http://www.arrl.org/shop>



I am trying to remember when I got my first ARRL *Repeater Directory*. (I probably still have it around here somewhere if I dig deep enough in my piles of "resources"). I'd guess it would have been around 1978, the 5th, maybe the 6th edition when I first got my Technician's Class license and could spend all my spare time rag chewing on the local repeaters using my Drake TR-33C. I still have that rig in the shack. It is a faithful old friend, just like the ARRL *Repeater Directory*.

While I can't quite put my hands on that old edition, I can say without a doubt that the size and scope has grown by leaps and bounds over the years I have been in the hobby. I know I have written in the past with some concern about the state of the VHF/UHF repeater activity, but when you realize that this latest edition sports just shy of twenty thousand listings across seven bands and multiple modes (including Internet Radio Linking Project nodes), somebody must be talking to somebody out there!

The listings in the ARRL *Repeater Directory* are gleaned from such resources as the national Frequency Coordinators' Council, and other recognized coordinators where appropriate. One notable change from recent editions is that digital listings have been removed and can now be found on a Web site sponsored by the Tucson Amateur Packet Radio Corporation (TAPR) at <http://www.tapr.org/directory>

Something some folks forget is that the *Directory* always contains a great section on repeater operating practices, hints for new hams and a guide for handling interference. I think any club that is running a license class for new hams should consider giving the *Repeater Directory* as a gift to everyone who passes their license. In addition to letting them know where to tune, the sections I just mention will go a long way to helping get those new hams started off on the right foot.

One suggestion I would have for the folks at the ARRL. We are all well aware that quite a few folks in our hobby are getting up there in years. I will be the first to admit that I am not the eagle eyed young pup I was when I first broke squelch all those years ago. I am not sure what the production costs would be on such a project, but the publisher may want to consider the addition of a Large Print edition of the *Directory* for those folks who may have some trouble reading the relatively tiny font that the *Directory*'s small size requires.

❖ Repeaters on the Road

Now, my habit has been to keep the current ARRL *Repeater Directory* in my shack and toss the previous year's edition into my car's glove compartment for checking out things while on the road. Having said that, I bet I am not the only ham in the world that has an interesting story or two to tell about what happened on the road while I was trying to reach across to pull out the old *Directory*.

A better (and perhaps safer solution) to ham radio road work might be:

TravelPlus for Repeaters
2005-2006 Edition (version 9.0)
CD ROM

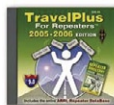
\$39.95

ARRL Order #9434

The American Radio Relay League
225 Main Street, Newington, CT 06111-1494

1-888-277-5289

<http://www.arrl.org/shop>



Now here I can tell you where my first (and every successive version) of *TravelPlus* resides: They are all still in the CD rack in my shack. I have been a fan of this software package since its original release and have been pleased with its continuous improvement as technology and computer capability have grown.

As anyone can easily note, computers have come quite a long way in the last ten years. To this end it must be noted that this latest version of *TravelPlus* requires a Pentium PC or comparable processor (I can attest it works just fine with AMD Pentium Equivalent chips such as the Duron series and higher). The package is designed to run under Microsoft Windows™ 98SE through XP. (I do not have the capability to test if it will run under Windows emulators for the Apple Mac or Linux operating systems.) Additional requirements are a CD-ROM (obviously), and a minimum of 16 MB of RAM (although 32 MB or more is recommended). Also, the program requires a minimum of 22 MB of hard disk space to run directly from the CD-ROM, but will require 122 MB of free space to run the program exclusively from the hard drive.

A minimum of 640 x 480 16 bit color graphics is supported. This is rather spartan, so it is likely most modern monitors and video cards are well within the requirements of this system. Since I have run all the versions of this software package across a number of computer systems, I can attest to its relative stability. The ARRL does provide a technical support resource for folks having difficulty with installation or operation of *TravelPlus*.

TravelPlus has two modes of operation that are simplicity itself. The one used most often is Map View. In this mode you simply point and click along a route on a map that shows the major highways in the United States and Canada (with additional coverage of state level roads in the US). This generates a list of repeaters along your route. The width of the footprint of the route is adjustable. One feature added to recent editions is the ability to set up the maps based upon input from a PC compatible GPS tracking unit. Of course, even if you have a GPS unit that does not interface with your PC, you can still enter the coordinates from the display into the system to find the appropriate maps.

The other main mode is known as the DataSource mode. This is essentially a computer-based version of the traditional printed edition of the ARRL *Repeater Directory* with

the added capability of database style search tools. And here's one answer to the tiny print found in the original *Directory*: Using the datasource mode you can resize the font and print out the systems of interest at a size you can easily read!

Both modes generate lists that can be used to pick frequencies to enter into your transceiver prior to your upcoming trip. These lists can be printed or exported to many of the popular radio programming software packages. Once you become familiar with *TravelPlus* and understand your radio's software capabilities, you may find this a really useful tool. You can also store files on your Palm or Pocket PC compatible handheld computer.

By the way, if you have stored route files with previous versions, they can be used with the latest version. However, you need to initially move them to another file folder prior to uninstalling the older version of the software. This prevents them from being erased in the uninstall process. Also, if you own a previous version of *TravelPlus*, contact the ARRL for details on available upgrades.

❖ The Vanishing Magazines

And now on to one of my *significant other's* favorite software packages.

**QST View
2000-2004 Edition
CD ROM
\$39.95**

ARRL Order #9418

The American Radio Relay League

225 Main Street, Newington, CT 06111-1494

1-888-277-5289

<http://www.arrl.org/shop>

I began subscribing to *QST* the year I got my first amateur radio license (1976). Like any dedicated ham, I kept my back issues around, mainly because of the great construction and technical articles. Whenever I feel like melting a little solder in my basement laboratory, I was always able to find something worth constructing in any one of my old *Q Streets*.

Now, why I say my wife is a big fan of this software is that, after many years of lugging my *QST* back numbers around as we moved, those back issues now take up a shoe box instead of several cases. (Not to mention that I don't leave the issues lying all around the house anymore either). The *QST View* compiled collections are a great way to still have access to all those fine

old magazines without needing to worry about creating a fire hazard.

System requirements are not radically different from those I listed for the *TravelPlus* package above. A Pentium PC, 16 MB (32 MB Recommended) of memory, 6 MB free hard disk space, Microsoft Windows™ 98SE through XP and 800 x 600 256 color video or better. And a CD ROM of course.

QST View gives the user a searchable collection of back issues of *QST*. In this case it covers all issues of *QST* published from 2000 through 2004, including all articles, ads, columns and covers. These are scanned documents that are read through the auspices of the Adobe Acrobat Reader program (included in the package). Articles can be searched by title and author, or you can view the issues by year or month.

How do I use this collection? I just like to browse. I never know what will turn up, but I can tell you, I always have a lot of fun when I stick a *QST View* disk into my PC.

It must be noted that these multi-year collections are different from the single year collections available since 1995. Those collections have additional search features and also include back issues of the magazine *QEX* and the *National Contest Journal*. The *QST View* collections are *QST* issues only. If you have no need for the additional publications, I feel the *QST View* collections are a much better value. *QST View* collections can be had all the way back to 1915.

Amateur radio is constantly changing and taking advantage of the latest technology. The ARRL publications group has hit three right out of the park with *The Repeater Directory*, *TravelPlus* and *QST View*.

Outer Limits continued from Page 59

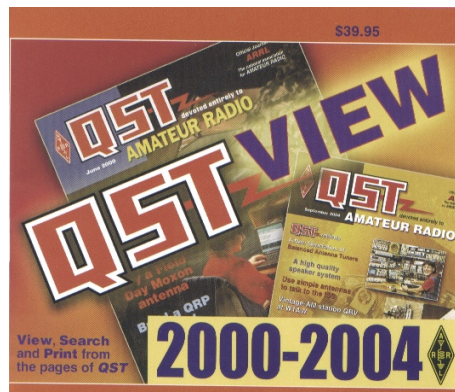
❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations, especially in Europe. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14895; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; and PO Box 293, Merlin, Ontario N0P 1W0.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for submitting pirate loggings remain *The ACE* (\$2 US for sample copies via the Belfast address above) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via niel@ican.net. The *Free Radio Network* web site, another outstanding source of content about pirate radio, is found at <http://www.frn.net> on the internet, and a few pirates will occasionally QSL a web site report left on the FRN.

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: John T. Arthur, Belfast, NY; Dave Balint, Wooster, OH; Artie Bigley, Columbus, OH; Ross Comeau, Andover, MA; Rich D'Angelo, Wyomissing, PA; Gerry Dexter, Lake Geneva, WI; Harold Frodge, Midland, MI; G. Victor A. Goonetilleke, Piliyandala, Sri Lanka; William T. Hassig, Mt. Prospect, IL; Harry Helms, Wimberly, TX; Chris Lobdell, Stoneham, MA; Leonard Longwire, Chicago, IL; Greg Majewski, Oakdale, CT; Larry Magne, Penn's Park, PA; Mark Morgan, Cincinnati, OH; Mike Ostrowski, Saline, MI; John Poet, QTH Unknown; Lee Reynolds, Lempster, NH; Martin Schoech, Eisenach, Germany; John Sedlacek, Omaha, NE; Niel Wolfish, Toronto, Ontario, and Joe Wood, Greenback, TN.



UNCLE SKIP'S CONTEST CALENDAR	
ARRL September VHF QSO Party Sept 10 1800 UTC - Sept 12 0300 UTC	
North American Sprint, CW Sept 11 0000 UTC - 0400 UTC	
Tennessee QSO Party Sept 11 1800 UTC - Sept 12 0100 UTC	
Arkansas QSO Party Sept 10 1400 UTC - Sept 11 0600 UTC Sept 11 1800 UTC - Sept 12 0200 UTC	
YLRL Howdy Days Sept 14 1400 UTC - Sept 16 0200 UTC	
QCWA QSO Party Sept 17 1800 UTC - Sept 18 1800 UTC	
North American Sprint, SSB Sept 18 0000 UTC - 0400 UTC	
Texas QSO Party Sept 24 1400 UTC - Sept 25 0200 UTC Sept 25 400 UTC - 2000 UTC	
CQ Worldwide DX Contest (RTTY) Sept 24 0000 UTC - Sept 25 2400 UTC	
Fall QRP Homebrewer Sprint Sept 26 0000 UTC - 0400 UTC	

Race Scanning

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- Racing terms
- Racing flags
- Choosing a scanner
- Tips and tricks
- Racing frequencies

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Some Basic Antennas for Short Waves

This month we'll discuss the some antennas commonly used for shortwave (HF or high frequency) monitoring and for ham radio communications. To begin our discussion we'll define a couple of important terms.

❖ Antenna Patterns and Antenna Gain

Antenna Gain:

Antenna "gain" refers to the relative responsiveness or performance of an antenna, either to incoming, received signals or in transmitting the energy supplied to it by the transmitter. The common means of making an antenna directional is to re-direct gain from some directions to supplement gain in one or more other directions. Thus, by re-directing an antenna's responsiveness, antenna gain can be increased for some directions. But in so doing, gain is reduced for other directions.

Radiation-Reception Pattern:

Essentially, all practical antennas give a greater response to signals from some directions than from other directions. That is, they are, at least to some degree, directional. An antenna's response can be visually represented by graphing the antenna's performance in both the horizontal (compass) directions and the vertical directions (from ground level to straight overhead). This graph is known as the antenna's "radiation pattern." This pattern

could also reasonably be called the "radiation and reception" (R&R) pattern, because it has the same shape whether the antenna is transmitting or receiving signals. Directions of maximum antenna responsiveness are called "lobes," and directions of minimal response are known as "nulls." An antenna's gain is usually reported as the gain of its largest lobe.

At HF a receiving antenna's gain is usually less important for determining quality of reception than is the antenna's R&R pattern. Using an antenna of higher gain, but with patterns identical to the original antenna, increases the strength of received noise and interference, just as it does the desired signal. Thus, the readability of the signal is not improved by merely increasing antenna gain. However, reducing noise and interference by pattern orientation leaves the signal more "in the clear." This can make significant improvement in signal readability.

Vertical Patterns and Length of Path:

Mounted a quarter wavelength above earth, a horizontal antenna yields a much higher-angle vertical functioning and performs well for close-in communication – up to perhaps 300 to 500 miles. When mounted a half wavelength or more above earth, the angles of the antenna's vertical pattern are much lower and become more useful for distant signals. This is true not only for the random-length antenna, but for the dipole and other horizontally-mounted antennas discussed below.

❖ Popular HF Antennas

The Random-Length Antenna:

Perhaps the easiest antenna to make is the random-length antenna. It is simply a wire of whatever length is convenient or practical. This antenna is usually run in a straight line, but can be bent a few times to fit available space if necessary. Although just a few feet will sometimes get the stations you want to hear, a longer wire is usually better.

For best performance, mount the antenna as high and as in the clear as is reasonable for your situation. Usually the random-length antenna gives decent reception in nearly all directions. However, if you make the antenna a wavelength or longer, it will begin to show directivity.

The Dipole Antenna:

Another antenna that is relatively easy to make and erect is the horizontal dipole antenna (fig. 1A). The most common length for this antenna is a half-wavelength; however, lengths as short as a quarter wavelength still provide pretty decent service.

There are nulls directly off the ends of a dipole. These nulls are not too deep for practical antennas mounted relatively near the earth as most of our antennas are. In other words, although dipoles are not non-directional, they do have significant response to all compass directions.

Inverted-V Antenna:

If the legs of a dipole are sloped downward, the antenna is known as an "inverted V" (fig. 1B). This antenna is a bit more non-directional than an ordinary dipole antenna, and has the advantage of needing only one high point of support. As with horizontal antennas, lower mounting supports close-in communication, and high mounting supports DX.

Grounded, Vertical, Quarterwave, and Ground Plane Antenna:

This non-directional antenna (fig. 1C) responds equally well in all compass directions, with a null directly overhead. Its vertical patterning is relatively low, which makes it a favorite with many HF Dxers.

In addition to its vertical element, this antenna traditionally requires radials on or in the earth around it. Radials attach to the shield of the antenna's coax feed line, and extend outward from the antenna like spokes of a wheel.

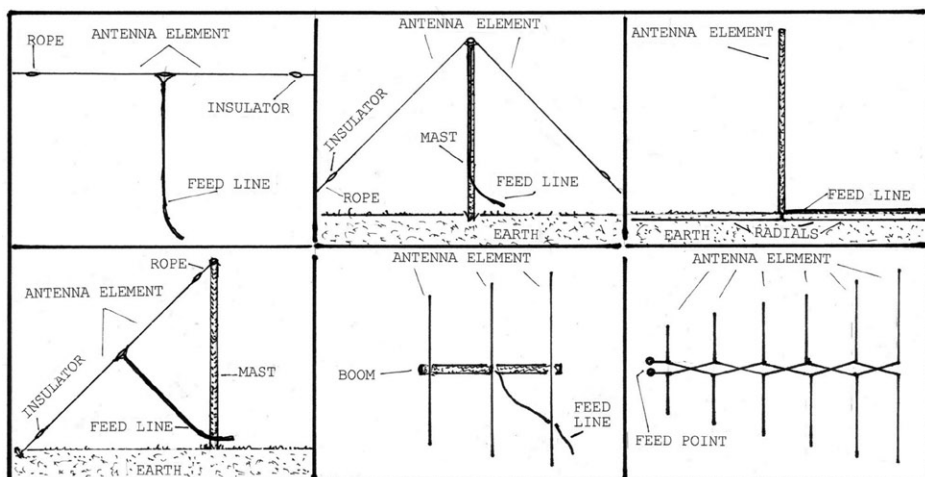


Fig. 1. A dipole antenna (A), an inverted-V antenna (B), a quarter wavelength, grounded, vertical antenna (C), a sloper antenna (D), a Yagi-Uda beam antenna (E), and an LPDA beam (F).

This Month's Interesting Antenna-Related Web site:

For building your own random-length, dipole, or ground-plane antennas, click on the Antenna Primer links in the technical section at http://www.monitoringtimes.com/html/mt_reference_library.html or on my radio page: <http://www.angelfire.com/musicals/oldcity/radiopage.html>

More recently, above-ground radials are being used with excellent results. When radials are well above ground, this antenna becomes what is known as a "quarter-wave ground plane antenna."

Sloper Beam:

The sloper (fig. 1D) is usually a half-wave-length dipole run at a slant from an elevated point down toward the earth. The antenna's R&R pattern is directional away from its mast in the direction through the antenna wire. Although this antenna's vertical R&R pattern does contain some low-angle radiation, it has a fair amount of moderately high-angle radiation also.

Yagi-Uda Beam:

With a sufficient number of elements, the Yagi-Uda beam (fig. 1E) can be made quite directional with relatively low-angle, vertical radiation. And, although it is not small, this antenna can be constructed to allow it to rotate to any azimuth direction. As with other rotatable beams, it can be positioned so that its lobes are oriented to maximize reception from

desired directions, or, so that its nulls minimize reception of noise or interference coming from a particular direction. The basic Yagi-Uda design covers only one band of frequencies; however, some models are designed to cover several different bands.

LPDA Beam:

Whereas the Yagi-Uda covers one or more relatively narrow band, the log periodic dipole array (LPDA) (fig. 1F) is a very wide-band antenna. With appropriate design, its generous bandwidth can be on the order of ten times its design frequency. Vertical and horizontal R&R patterns are generally similar to those of a Yagi-Uda beam with four or five elements.

The LPDA is more complex, larger, and heavier than the Yagi-Uda. Nevertheless, like the Yagi-Uda, the LPDA is usually constructed so that it can also be rotated.

RADIO RIDDLES

Last Month's Radio Riddle:

I asked: "Obviously, beam antennas, such as the Yagi-Uda discussed above, often have much to offer for improving your reception. On the other hand, their use can actually be a handicap at times. Why is this so?"

Well, one place where a beam antenna is obviously not ideal is in broadcasting, when it

is usually desirable to transmit in all compass directions to reach the maximum listening audience. Another instance where a beam can be a handicap is when several stations are operating as a net, and the net's stations are in many different directions from the net control station. Then, when communicating with the various net stations, the net-control's beam may require frequent repositioning. This can be time-consuming and frustrating.

This Month's Radio Riddle:

The antennas discussed this month are described as antennas for shortwave, i.e., HF. Will these antenna designs work on other bands such as LF, MF, VHF, UHF, and microwave bands?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

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Radio Role Reversal

Readers who have been following this HQ120-X restoration project so far, know that I've been having a tough time deciding which chassis to use as the basis for it. I needed to make a choice between the set I had originally purchased – which had a nice front panel, including an S-meter whose scale had not yet yellowed, original knobs and a decent cabinet – and another set I bought later for parts. The latter had a butchered front-panel and cabinet, non-original knobs, and a very yellowed s-meter scale.

Other factors were that the original set had a burned-out 10-meter antenna coil, a warped bandspread dial, and butchered power-supply wiring. Of course, the antenna coil and bandspread dial could be transferred over from the other set and the power supply wiring could be straightened out.

It is tempting to think of restoring the “parts set” chassis instead of the original, because it was a later version having the advantage of some circuitry revisions. I also have the owners/service manual for this version and not the earlier one. On the other hand, the parts set looked as if it had been stored in a garage, while the original set might have been stored in an attic or a dry basement.

I was also initially suspicious of the fact that the parts set had so many bad or weak tubes – a possible sign of some past electrical trauma. But I later decided that the number of bad tubes was too great for ordinary circumstances. The previous owner had likely made some substitutions to improve his tube stock before offering the radio for sale.

Making a Choice

Weighing all these factors, I found the call too close to make by any logical means – so I decided to go with my gut and work with the former “parts chassis.” In a Frankenstein-like transplant, it would receive the front panel (complete with “S” meter), knobs and cabinet from the original radio. The latter, now the parts set for the former, would receive the former's panel, knobs and cabinet.

The restoration would begin by making this switch so that I wouldn't mislay any of the parts I had removed. And, having the chassis to be restored equipped with a cabinet, would protect the chassis and give it a firm level support while turned upside down for recapping

and servicing. This strategy was made possible by the fact that the bottom panel of the radio is separate piece from the cabinet and can be completely removed.

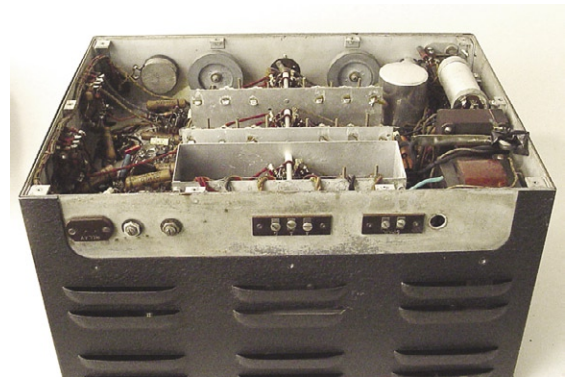
I remember I used the same strategy in our recent National NC-57 restoration, only to find myself in the position of having to dismantle the cabinet and front panel again, later in the project, to remove and repair a defective potentiometer. If that happens, it happens – it'll still be worth it.

Knob and Panel Cosmetics

Prior to reassembling the chassis in its new cabinet, I set all of the knobs to soak in a container of laundry detergent solution. Then, temporarily removing the “S” meter, I went to work on the panel. This was in pretty good shape except for the expected accumulation of grime. The worst problem was a strip of masking tape, stuck under the BFO dial to record some setting, that had hardened to a cement-like consistency.

Having learned my lesson after accidentally messing up a painted panel back in the past, I decided against the use of solvents. Instead, I held the area with the masking tape directly under some super-hot water dribbling from a faucet – occasionally test-scraping the tape with my fingernail. It took quite a while and some of my nail, but eventually the ossified tape began to give. It finally went away, leaving hardly a trace.

The grime was removed from the panel with an application of Turtle Wax auto



With the cabinet installed, the top of the chassis is protected and the radio has a firm foundation to rest on during restoration work.

polishing compound. I tried it out first on my “throwaway” panel to make sure that it would not attack the finish. I can't say that the compound brought up the showroom shine promised on the can. But I did end up with a very clean looking semi-gloss effect that was a great improvement over the original appearance.

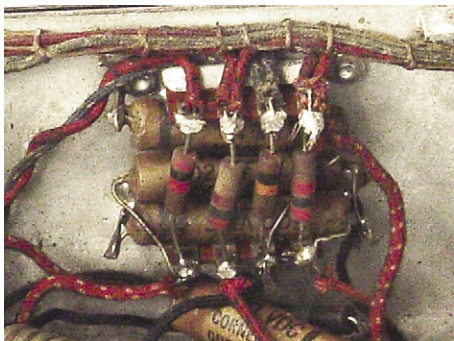
There are circular areas of high gloss – polished by the fingers of previous owners – surrounding some of the knobs. These I decided to live with. There was no way that I was going to bring up the entire panel to that level of gloss without really drastic, and possibly destructive, polishing. Any regular watcher of “Antiques Road Show” knows that legitimate signs of previous use are part of an antique's charm and not to be polished or refinished out – right?

With the panel taken care of, I rinsed and paper-toweled the knobs, temporarily setting them aside for complete drying. Then I assembled the panel to the chassis of the former “parts set” and installed the cabinet. Using the parts list in the instruction manual as a guide, I had already ordered, and received, the 30-odd capacitors that would be needed for the complete recapping of the HQ120-X. So I'm now immersed in that work.

There won't be much more to report about this restoration until I can complete the recapping and can try a “smoke test.” This should be accomplished in time for next month's column. I'll probably have a few adventures to report, since some of the caps are tucked away



The restored front panel now fitted to the chassis of the former parts set and ready for installation of the knobs.



Some of the capacitors are installed in locations bordering on the inaccessible. Apparently the designers felt that they'd never have to be changed out.

in pretty strange places. Apparently the Hammarlund designers felt that those wax-sealed paper capacitors were going to be permanent parts of the radio. I guess we can't blame them for not anticipating that a group of crazies like us would want to put their products back into working order 60 or 70 years later!

From the Mailbag

Here are a couple of interesting items received from readers. They have been waiting for me to find the right spot to include them.

The first is from **John Malley, N1LZI**, of Enfield, CT. John says that a hand cleaner called "GOJO" does a bang-up job of putting the luster back into Bakelite radio cases. He's been using it that way for years. You can find GOJO in the auto section of Wal Mart and at other auto supply stores.

Dale Parfitt, W4OP, is one of the few people I know of who has refinished panels for communication receivers, complete with new silk-screened lettering and other markings. After scanning the panel, he uses Photoshop in "tracing paper" mode to create new artwork. (He finds most lettering to be common standard fonts). Then he strips the old paint and airbrushes the panel with acrylic paint that has been computer-mixed for an exact match at an auto paint shop. This type of paint, he says, is far more durable than anything that comes pre-packaged in a spray can.

Printing out the new artwork, Dale takes it to a photo service to have a negative made. The negative then goes to a silk-screening shop, where it is used to "burn" a screen. The same shop utilizes the new screen to ink the lettering onto the refinished panel. It's expensive, says Dale, but the results are terrific!

Photoshop can also be used in similar fashion to create new radio dials. Once a JPEG is created, it can be printed out on Avery label paper to make a paste-on opaque dial. Clear label paper is also available if a transparent dial is needed.

Similarly, JPEGs created in Photoshop can be printed out on decal media to turn them into water-slip decals. This seems like it would be a wonderful way to revitalize a radio panel where use of the expensive silk-screen process would not be warranted. Decal media are so thin that they are almost undetectable

after drying. Media are available for both laser and inkjet printers. Do a Google search to find sources.

Dale can supply JPEGs for panels he has already redone. If you are interested and have a broadband internet connection, contact him at par@parelectronics.com

Survey Comments

I'd like to thank the many readers who took the time to send me comments for the "Radio Restorations" column survey I solicited a few months ago. When combined, your letters and e-mails filled about 30 single-spaced pages. From the enthusiasm evident in the responses, I'm concluding that most of you are generally happy about the approach and content.

There seems to be some support for adding news of antique radio club doings and also snippets of radio history. The topic-oriented "interludes" I've done (such as the recent mica capacitor code column) got good marks and readers would like to see more of them. Several topic suggestions were made.

The suggestions for equipment to be restored in addition to the current mix have included some types I've already done and intend to revisit – such as household and military radios, more complex sets (an area we're beginning to get into with the HQ120), and test equipment. Of course, not all respondents have read all of the columns – which is a good reason for revisiting some of the earlier topics.

Other sets mentioned that have not yet been touched on, but which I could easily work in, are 1950s radios using printed circuits and miniature tubes, vintage ham transmitters, 1920s battery radios, and portables such as the Zenith Transoceanic.



Tom Henchy's Hallicrafters S-38 occupies a place of honor at his receiving desk.

To give you an idea of the flavor of some of the remarks that have been received, I'll quote from a letter from Tom Henchy of Murray, Utah. I selected Tom's letter not only because his comments are typical of many received, but also because he happened to send a picture – which I'm reproducing here – of himself at his listening desk.

By way of background, Tom doesn't do much radio restoration himself, but enjoys reading about it. He has been a radio buff since childhood and, though most of his equipment is modern, he was re-introduced to the pleasures of watching the warm glow

of vacuum tubes in a darkened room when he acquired a Hallicrafters S-38. Under some conditions, it outperforms his Kenwood TS-430S!

He goes on to say, "...As to your column, I think your pace is right on as this is work that can't be rushed and must be done in stages. I would like to see you list resources for repairing vintage radios for those of us who don't do this work but love operating the old sets. ... Finally, speaking as a subscriber, your column is standard reading for me and would be sorely missed if it went away. In the survey [conducted by MT last year], I noted a continuing need for vintage shortwave radio restoration, documentation and history, as it is the foundation of our hobby today and all the high tech stuff out there can never match the 'warm glowing tube look.'"

How about a Pic From You?

I really enjoyed Tom's letter and picture, as well as the many other letters sent in response to my survey. In fact, I think it would be interesting to include reader profiles as a regular feature of the column. So how about it, folks? Send me a picture of yourself and the vintage equipment you are using or restoring (or just of your equipment if you happen to be shy), and include a few paragraphs about your interests and/or activities. I'll run it in the first possible column and, if participation is great enough, I'll try to make room for a reader profile in every issue.

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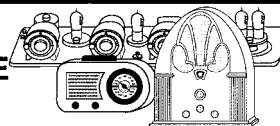
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MT

REVIEW

The Kaito KA105

A Poor Man's Pocket Digital

By Eric Bryan

From the people who brought us the KA1101, KA1102, and the WRX911, here is a digital world receiver almost as small as the Grundig Mini World 100PE. At 4.25" x 2.75" x .75", the Kaito KA105 is a true shirt pocket radio and one of the smallest sets available, digital or analog. Sleek and smooth, it features an attractive and sturdy bare aluminum face.

Layout

Like the Kaito WRX911 (reviewed in *MT* Oct 2004, available online), the KA105 is arranged horizontally. Most things are standard here. A tiny speaker is on the left, the LCD read-out is in the upper right, and there are buttons on the face beside and below the display. But there's one deviation from the usual: The keypad, instead of being in the traditional telephone key layout, is in two horizontal rows, 1-5 and 6-0. For operating by feel in bedside darkness, this new configuration has to be learned.

On the left side of the KA105 there is a telescopic antenna which can extend to 16" or collapse into the cabinet, an external antenna jack, an FM mono-stereo switch and a carrying strap (which I can only fit four fingers into). The right side of the unit has a standard volume dial (but like the WRX911's, up is up, down is down, opposite to the usual), a headphone mini jack, a lock switch (which disables all controls except light, volume, and mono-stereo), and a 3-5V DC power jack.

The KA105 has two small feet for sitting vertically, though the bottom edge of the unit is beveled on the front and narrows slightly, so it's not very stable in this position. Like the Sony SW1, a plastic tag tied to the end of the carrying strap doubles as a stand when pressed into a slot in the back of the set. This way the radio rests at a comfortable 30-40 degree angle. The unit is pretty secure in this attitude, but the tag/stand doesn't always stay in place. There are also four tiny feet so the Kaito can rest on its back, though they're not quite level so the radio wobbles slightly.

Because of its placement, whip rotation is somewhat limited. When sitting vertically, deep antenna angles will topple the KA105.

The rear battery cover is hinged to prevent loss.

Coverage

This radio has MW, FM, and SW divided into 3 "bands." Coverage is 520-1710 kHz in 10 kHz steps, or 522-1620 kHz in 9 kHz steps,

87.5-108 MHz in .05 MHz steps, and 5.950-15.600 MHz in 5 kHz steps.

Tuning

After turning the KA105 on, unless already in your chosen band, you must press BAND to cycle between MW, FM, and SW. Once in one of these bands, you can then enter a frequency or memory directly or tune via + or - buttons within only that band. You cannot direct enter a MW or FM memory or frequency while in SW, for example. You have to first enter MW or FM by the BAND button to gain access to either of those bands.

Direct entry is conventional. When in MW or SW, press the AM button, then enter your frequency and press AM again. When in FM, the FM button works the same way.

Manual tuning with the + and - buttons also functions in the usual manner. One press of one of the buttons moves you one frequency step up or down. Holding one of the buttons down carries you fairly rapidly up or down through the frequency steps. Tuning is muted. If you attempt to pass through the top or bottom of a band, you are automatically relayed to the opposite end of that band.

Auto Scan

Starting auto scan mode is simple. Press and hold the + or - button for about one second

and let go. When a medium to strong signal is encountered, scanning stops and stays on that frequency. You must reinstitute auto scan mode to continue.

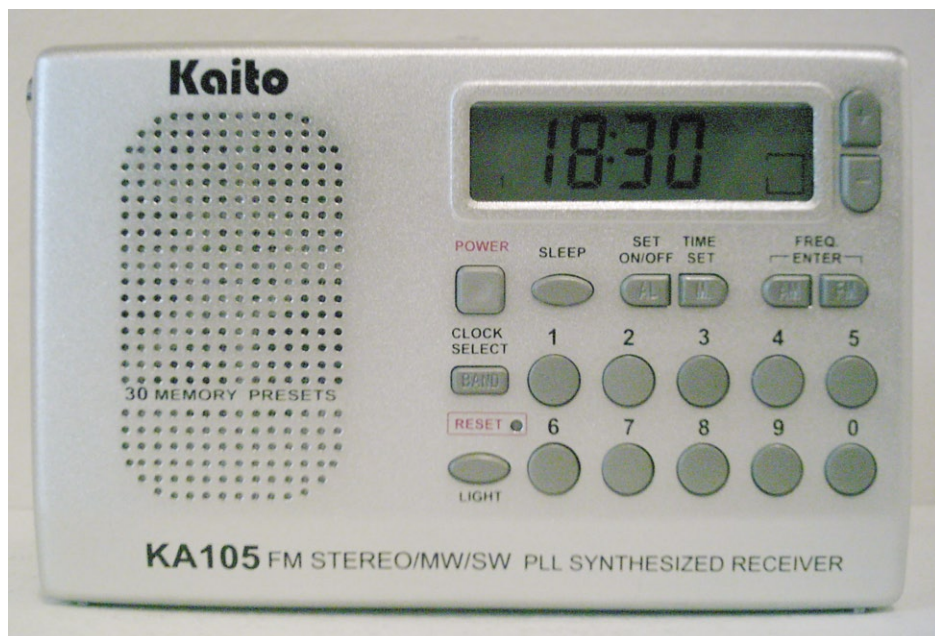
Like that of the Degen DE1103/Kaito KA1103, auto scan is slow on the KA105. Also, when initiating auto scan, the function has the tendency to leap through the next 1-3 channels before actually starting scanning, causing you to miss signals on those neighboring frequencies. No amount of finesse seems able to overcome this characteristic.

Memories

The Kaito has 30 memory presets, 10 each assigned to MW, FM, and SW. Setting memories is easy and intuitive: Select a frequency, press the M button, hit a direct entry button 1-0, punch M again, and that channel is preset. For memory recall, the set has the coveted one-touch system – pressing any of the direct entry buttons 1-0 calls up its ascribed preset – perfect when reaching out half asleep from the bedside in darkness. But you'll have to memorize where the BAND button is, so you can access by feel memories in all three bands.

Clock, Alarm, Sleep

The KA105 has two clocks, both in 24 hour format, convenient for setting one to UTC, the other to local time. Time setting is easy and, as



you would expect, done with the radio off. The clocks can't be accessed while the unit is on. The alarm is simple to set, with the radio on or off, and works like a charm (wake to radio only).

The owner's manual states that the Kaito can be turned on by pressing the SLEEP button, but the set has to already be on to activate the sleep timer. Again, this couldn't be more convenient: One punch of the button gives you 90 minutes of listening, and each additional pressing reduces the time by 10 minute increments down to a minimum listening time of 10 minutes. One more punch zeroes the sleep timer. When setting the sleep timer, the time, 10-90 minutes, replaces the frequency display for a few seconds. Once the readout reverts to frequency, the timer can be cancelled by simply pressing SLEEP once.

The LCD

With the set off, the LCD shows the time and denotes which clock, 1 or 2, is displayed. When the unit is on, the LCD identifies the selected band, AM, FM, or SW. The frequency is read out in kHz on MW, and in MHz on FM and SW. On SW and FM, the last digit is deleted on all channels ending in 0, so 15.600 reads as 15.60. On all frequencies ending in 5, a small 5 about one-fourth the size of the other numbers appears in the last digit place. This takes a little getting used to on SW.

When a memory is selected, its assigned number, 1-0, appears in a box in the lower right of the LCD.

If receiving in FM stereo, a tiny twin-

speaker icon shows. When the alarm is set, an image of an old fashioned twin-bell alarm clock appears. The usual key symbol shows when the lock switch is activated.

A low battery icon flashes when the cells get low, and when the sleep timer is set, a cozy looking bed, complete with bedposts, covers and pillow, is represented.

Illumination

The LCD is illuminated with a bright greenish light activated by a button on the front of the Kaito. The button must be held down to keep the light on. Much of the light washes in front of the LCD rather than fully backlighting it. This has a somewhat blinding effect, partially obscuring frequencies. Most of the light is on the left of the display, with information on the right dim and hard to read. When the LIGHT button is depressed in MW or SW, a chirping click is heard over the speaker or earphones.

Power

The KA105 runs on two AA cells or a 3-5V AC adaptor. You have a 3 minute window in which to change batteries. If you exceed this, you'll dump all your memories and clock settings. I made the mistake of running a set of NiCads down until the radio shut itself off. Despite changing batteries immediately, I lost all of my settings.

This radio seems to be more forgiving on two AA batteries than the Sony SW1.

Accessories

This Kaito package includes a 120V

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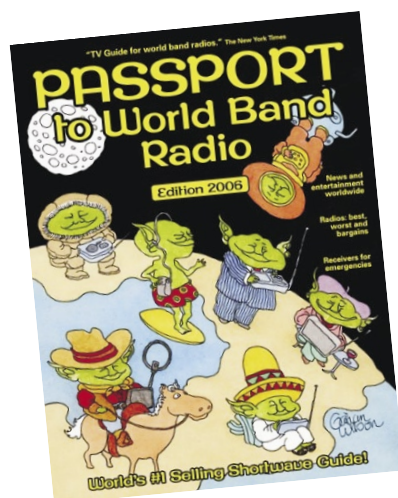
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Audio

Sound from the little speaker and earphones is crisp and clear, like that of the 100PE and WRX911. I was able to listen to 12160 kHz over the speaker with just the whip without any problem while soaking in an afternoon bath (once the water was shut off).

Build Quality

The aluminum face of the KA105 is strong and well-fitted. On the way back from a short hike my radio was riding on the passenger seat and in a sharp left turn it slid off, knocked into the door panel, and clattered onto the floor. The only damage was a slight scratch on the aluminum face.

The buttons, switches, and volume dial are all pretty smooth and solid and easy to use. The back of the cabinet is plastic, painted a silvery grey, and feels sturdy enough. The unit has a solid, heavy feel for its size.

The plastic cabinets on some of the Kaito and Grundig (Tecsun made) radios, rather than being molded in the finished color, are usually cast in a weak approximation. The final color is then painted on. The finishes on both my 100PE and WRX911 are wearing away on the corners, revealing the opaque, anemic colors of the plastics underneath. The rear of the cabinet of the KA105 is the same way. These radios would have lasting finishes if the plastics were mixed and molded in the finish colors.

Performance

This is a single conversion radio, so is subject to images and spurious signals. When tuning around I thought I'd check for The Overcomer on 6870. I found a strange signal, but no Brother Stair. Tuning down, I discovered the odd 6870 signal was actually bleed over from a strong station on 6855. (Selectivity is where an analog such as the 100PE or WRX911 can have the advantage over the KA105. You can tune slightly off-center with an analog and reduce the interfering signal. With digital 5 kHz steps, you're pretty well stuck with being on or off frequency. But unlike the 100PE and WRX911, the digital KA105 is of course drift-free.)

When the 31 meter band had several strong stations, I noticed images of them in the 8 MHz range.

Radio Thailand's colossal relay signal on 5890 could be heard in the background various places on 49 meters. This decreased or disappeared when receiving with just the whip.

To rate sensitivity, here are the stations I've been able to receive so far in Washington State with an indoor 35-foot wire plugged into the KA105 (not counting the usual major stations):

Botswana (VOA Africa)	9885
Bulgaria	7400 9700

Croatia (via Germany)	7285
India	9425
Iran	9860
Italy	11800
Kuwait	11675
Mexico	6185
S Africa (RFI)	15160
Sweden	9490
Turkey	15350
Ukraine	7545

I was surprised when, unplugging the wire and bringing the radio to another room, I was able to listen to AIR India with just the 16" whip.

On MW, my local station on 1330 has splatter from about 1230 to 1460 on the Kaito. But the odd thing is, with precise directionality, I'm just able to pull out a weak signal on 1300 out from under the fat 1330 footprint. (I wrote in the Oct. 2004 issue that the WRX911 was unable to peel 1300 away from 1330. Now that conditions have changed, I now find that it can do that, and with less 1330 interference than the KA105.) At night, some stations in Idaho, Oregon, B.C., Alberta, and California often come in well.

The KA105 is strong on FM, receiving the weaker college stations easily. A fairly distant CBC station in B.C. is also listenable and, with the external wire, crystal clear.

As with the 100PE and WRX911 and other pocket radios, sometimes reception is greatly improved when holding or touching the radio – very frustrating. This tendency is eliminated when an external antenna is plugged in.

Overall

The limited SW coverage, the muted tuning, and the somewhat hard to control and slow auto scan can make getting around on the KA105 a claustrophobic experience. The WRX911 and 100PE are much more tuning-accessible and easier to use for budget bandscanning (though neither have clocks or alarms).

The ease of setting clocks, alarms, sleep timer, memories, the simple direct entry of frequencies, and most of all, the one-touch recall of presets, are all pluses, especially for a travel and bedside radio.

This Kaito would be easier and more pleasurable to use with these alterations:

- * Expand coverage to at least 18 MHz (and reaching lower than 5.95 would be nice, to about 5.70)
- * Make auto scan faster, and more precise so that nearby channels aren't skipped when commencing scanning
- * Adjust the dial light to a true backlight (unless my particular unit has faulty lighting)
- * If possible, eliminate muting on tuning
- * The lock switch should probably also disable the light button, which is bound to be pressed on when the radio is wedged into a backpack or suitcase, draining the batteries.

Otherwise, here's a tough little pocket radio with digital precision, reliable sleep timer and alarm functions, and easy direct entry and memory recall operations. And like the WRX911 and 100PE, my reception results show that this set can do more than receive just CRI, the BBC, and RN. The poor man or woman can find the Kaito KA105 currently for \$39.95 plus shipping at Radios4You.com. The Kaito line can be seen at <http://www.kaitousa.com>.

PSK31, or Phase Shift Keying, 31 Baud, is an easily achieved mode of operation, and is one of those projects that combines your ham radio talents with your incessant desire to work with computers!

The “Warbler” – PSK31 on a Budget

By Carl Herbert AA2JZ

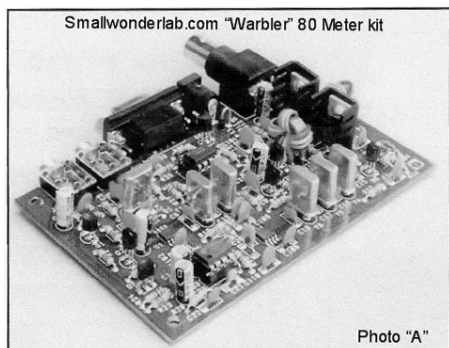
My brother Art, AB2AF, led me into this project. He likes trying something new in amateur radio from time to time, so when he began his “brag session” about his new “PSK31” adventures, I just had to find out more about it.

The advent of PSK31 is attributed to the endeavors of G3PLX. This mode functions similar to radio teletype, except it works from computer keyboard to computer keyboard. The data transmitting and receiving devices in this case are computers (utilizing appropriate software) and not the electro/mechanical machines of yesterday. (New hams will never know the hot oil odor emanating from noisy teletype machines, incessantly banging out their “copy.” Some things are a blessing!) More about the advent of PSK31 can be learned by visiting the websites listed at the close of this article.

Art purchased a very reasonably priced kit (around \$50) from Dave Benson at Small Wonder Labs (<http://www.smallwonderlabs.com>) called “The Warbler.” That’s not a high price to pay in today’s market, and the software needed to place it into operation is **free**! All else that is required is assembly of the kit, suitable power supply, add your 80 meter antenna, and hook it up to your computer. Now what could be easier than that?!

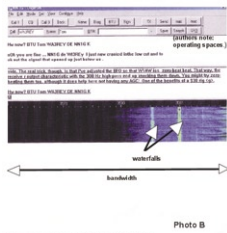
This easy-to-build kit comes complete with all the “on board” parts and a double sided circuit board measuring 3 inches by 4.5 inches. An enclosure wasn’t available, but with a board that small, finding something suitable shouldn’t be a problem.

The kit was offered for sale by the New Jersey QRP Club, but has since been “retired” from their offerings. It is available, however, from Dave at Small Wonder Labs. Included in his website is an area called “Kit Notes,” which is an invaluable source of information about this project. Also listed is a Manual for kit construction which includes the schematic and parts list for the project. (More about this, later.)



“DigiPan,” or Digital Panoramic Tuning, is the software used to make the Warbler functional, in conjunction with your computer and its sound card. The website to download this software is listed at the close of the article, and it can also be had at the Small Wonder Labs website.

The software produces a “waterfall” display and operating space for message text across the width of the computer screen. The width of the waterfall indicates the typical bandwidth of the receiver being used, and amateur stations being received. Stations are indicated by a yellow column or “waterfall.” The software utilizes “point and click” operation, and is very easy to use. There are many options in the software to explore – preset calls, preset operating outputs, text sending options, and more. You really need to download the software and explore for yourself.



❖ Bitten by the Bug

Art was having all the fun with this “new to him” mode while I was feeling left out. I downloaded the software and installed it, just to see what all the commotion was about, and toyed with it for an hour or so. Of course, without a rig attached to it, you can’t receive signals and “see” anything other than the basic software.

But the bug had already bit, and I wondered, “Just how difficult a project could this be?” The answer wasn’t long in coming.

The schematic and parts list in Dave Benson’s “manual” provided the necessary information to begin homebrew construction of my own Warbler. I enjoy building “Manhattan Style.” More information about this process can be found on the NJQRP website.

I have the “privilege” of having a rather large “junque” box, so homebrewing is always my first

choice, though kit construction is a very attractive alternative. Not all of us have the assets, skills, or desire to build from scratch. Choose the method of construction that best coincides with your talents. Kit building also has the positive aspect of providing *all necessary parts* in one package. This can avoid considerable time and frustration. There always seems to be something that’s not in my parts box that I desperately need.

❖ Operation

Having completed construction, putting the Warbler into operation was easy. The software was downloaded and functional, a readily available power supply attached, and an antenna connection made.

Daylight hours on 80 meters is not the most ideal time for this frequency. (The Warbler functions on color-burst crystal frequency of 3.579545 MHz, plus or minus a kHz.) I find evening hours to be the most productive, and often there are several stations visible on the display. On weekends, the activity increases, and the fun never seems to end.

The range or distance of communication with this device is listed at about 200 miles or so. But as always with “ham” gear, conditions often make communications possible over greater distances! Not bad for a 3 watt PEP (peak effective power) mini transceiver!

Give it a try! PSK31, plus your Warbler and your computer may just be the new wrinkle in your amateur radio hobby you’ve been looking for.

Happy building !

Acknowledgements:

Thanks to Dave Benson, K1SWL(NN1G) at <http://www.smallwonderlabs.com> for permissions granted, his work with PSK equipment, and provided documentation. Also thanks to N2APB, George Heron, and the NJQRP club, for permissions and help with this article.

Information about PSK31 operation, and topics presented in this article can be found in the following websites:

<http://www.smallwonderlabs.com> - PSK31 equipment & software
<http://www.njqrp.org> - links, etc to PSK31 & projects
<http://psk31.com> - software and definitions, etc.

This is your equipment page. Monitoring Times pays for projects, reviews, radio theory and hardware topics. Contact Rachel Baughn, 7540 Hwy 64 West, Brasstown, NC 28902; email editor@monitoringtimes.com.



Radio Shack Pro-97

Decent Performance at a Decent Price

By Larry Van Horn, N5FPW

MT Assistant Editor

When I got my first look at the Radio Shack Pro-97 scanner (Catalog number 20-527), I was disappointed to see that it was not packaged in a box like a lot of other higher end (over \$200) scanners in the marketplace. This scanner was in a clear plastic blister pack, which raised all sorts of red flags for me. Maybe I am a bit spoiled, but I tend to associate anything packaged in a blister pack as a low end product in a company's product line.

Despite my initial impression based on the packaging, I decided to take the radio for a spin, and the final result, as you will see, was a pleasant surprise.

❖ Product Overview

The Pro-97 is an analog only, conventional and trunk tracking handheld scanner. This triple conversion scanner has 1,000 memory channels divided into 10 banks of 100 channels each. The scanner cruises along at 75 steps per second (search mode) and 60 channels per second memory scanning rate. Image rejection is excellent, thanks to the triple IF stages at 455 kHz, 21.4 MHz and 380.8 MHz.

The table below shows the frequency coverage and tuning steps programmed for each band.

Frequency Coverage/Steps:	
25-54 MHz	5 kHz
108-136.99166 MHz	8.33 kHz
137-174 MHz	5, 6.25, 7.5, or 12.5 kHz
216.0025-225.0000 MHz	5 kHz
225.025-405.975 MHz	25 kHz
406-512 MHz	6.25 kHz
806-823.9875 MHz	6.25 kHz
849-868.9875 MHz	6.25 kHz
894-960 MHz	6.25 kHz (excluding cellular)
1240-1300 MHz	6.25 kHz

The case measures (HWD) 5-3/4 by 2-9/16 by 1-5/8 inches (145 x 65 x 42 mm). It weighs 8.5 oz. (240 grams) without antenna and batteries and 13.0 oz (366 grams) with antenna and batteries.

There is an amber colored back light system for both the display and keyboard. The display measures 11/16 by 1-5/8 inch and is a liquid crystal display that is easy to view at all angles.

Unlike the newer Uniden scanners, the Pro-97 does not use a menu driven system in programming the radio. In fact, programming

is pretty straightforward as most of the GRE models are. The user interface and keyboard is well thought out and user friendly. We were able to program most of the functions without referring to the user manual.

❖ What's in the "box"?

In addition to the scanner, the package also included a six inch rubber duck (BNC connector) antenna, plastic belt clip, non-rechargeable and rechargeable battery holders (no batteries

included), user guide, quick start guide and preprogrammed frequency addendum.

The Pro-97 uses 9VDC, but the AC adapter is not included. It can be purchased separately (listed at \$13.99 Catalog #273-1767). A nice touch is the availability of an optional DC adapter for use in a vehicle (listed at \$16.99 Catalog #273-1863). Also the PC interface/cloning cable is not included. It uses a non-standard interface that can also be purchased from Radio Shack (listed at \$24.99 Catalog #20-289).

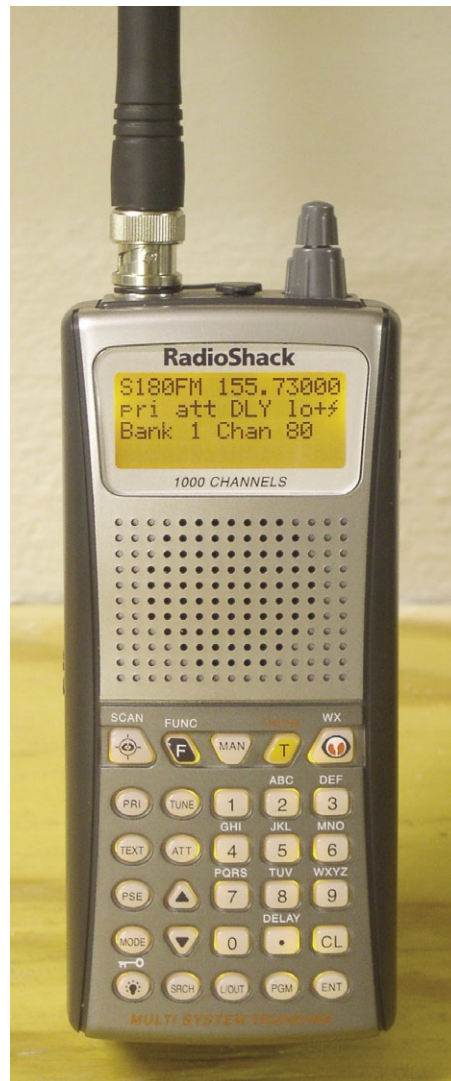
There is no mention in the packaged literature or on the Radio Shack website of any PC interface or cloning software. I would recommend checking with Computer Aided Technologies (an MT advertiser) to see if they are going to offer support for this scanner in their popular *ScanCat* software package.

The plastic belt clip is definitely a weak link in this scanner. While it is made of a hardened plastic, my experience with this sort of clip is that they don't last long. And, unlike some of the previous models produced by GRE, this clip slips on to the back of the scanner (not attached by screws), so the user probably won't be able to attach a studier clip.

❖ Checking under the hood

The Pro-97 has a very nice feature set for the price. Some of these features include:

- Trunk track Motorola, EDACS and LTR analog systems.
- Alpha-numeric display for ID tagging allows frequencies to be easily identified by the name you assign to them.
- Digital weather alert indicates watch, warning, statement or test statement along with seven preprogrammed NOAA weather channels.
- Five service search keys for marine, fire/police, air, CB and Ham bands.
- AM/FM mode selector.
- 20dB attenuator.
- One priority channel.
- Key lock for safety, key tone on/off and frequency lock-out



★★★★★
MT Rating: 3 out of 5 Stars

MT First Look Rating (0-10 scale)

Audio Quality.....	7
Audio Levels.....	8
Back light/Display	8
Battery Life.....	7
Ease of use	7
Feature Set	6
Keyboard/Button/Control Layout	7
Overall Construction	7
Overall Reception.....	7
Overall Manual.....	7

- Low battery indication and power save.
- EEPROM memory backup.

The Pro-97 incorporates the new "Signal Stalker II" technology. Like its Uniden "Close Call" counterpart, SSII provides a powerful new tool to rapidly detect, monitor, and store frequencies of nearby radio transmissions. The Signal Stalker feature is similar in functionality to portable frequency counters that cost much more than the Pro-97 scanner; however, it provides a number of advantages over the typical frequency counter.

Signal Stalker allows the user to sweep the entire range of the Pro-97 scanner's design frequencies, or you can specify those frequency ranges that you wish to sweep and exclude ranges that you do not want to sweep. This allows you to omit frequency ranges with constant, strong frequency activity, such as those with paging or broadcast transmitters. Many portable frequency counters will remain locked to a nearby constant signal, such as a paging or broadcast transmitter, and will not function properly until you have left the vicinity of the transmitter.

The Signal Stalker II feature is more sensitive than portable frequency counters and will detect transmissions at a greater distance. You can activate the attenuator to reduce the sensitivity if desired.

Like a frequency counter, once an active frequency is found, you can quickly store it into any memory location. But, the most significant difference between Signal Stalker and a typical frequency counter is that the captured transmission is also played through your scanner's speaker.

❖ Overall Rating and the Bottom Line

Battery life was good. Using four AA 1800 mAh Ni-MH batteries we got about 18 hours of usage before we had to recharge our batteries. Audio was also excellent using the built in 1-3/8 inch speaker. Battery charge current rated at 150 mA and drain was 90 mA with the unit squelched.

While there is a lot I like about this scanner, I do have some complaints. In addition to some of the items I have pointed out in the narrative above, there is no digital decoding capability. Given the changes we see today in the public safety, federal government and military land mobile frequency bands, the absence of a digital decoding capability and trunking digital systems is definite negative.

The manual is written on a basic level, easy to understand and follow, but we did note several typos and the receiver specifications for two of the bands that the unit covers were entirely omitted from the specification sheet.

The civilian aircraft band step size shown in our frequency table above is not a misprint: GRE, the manufacturer of this product for Radio Shack, put in the European civilian aviation spacing standard instead of what we use here in the U.S. Even though the U.S. will reportedly eventually change to that spacing at some point, that change is still sometime off in the distant future. This is a major error in the scanner's programming that will directly affect civilian

aircraft band searching and the proper readout of the frequency being monitored. This spacing does not affect any frequencies entered from the keyboard.

While we didn't put the scanner on the bench, our field test did seem to indicate a fall-off of sensitivity in the 225-400 MHz aircraft band compared to other scanners in our workshop. I was also disappointed that Radio Shack did not include a search function for this band, but you can easily program a custom scan for this band.

Bottom line, there is a lot of scanner here for the list price of \$219.99. If you live in an area where a digital system is not in use, or you want a scanner for the road for milair monitoring, or you want a decent second scanner for conventional scanning, then the Pro-97 is a good buy.

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- ♦ SWL IR Remote for ICOM Transceiver ... \$69.95
- ♦ SWL IR Remote for ICOM IC-R75 \$79.95
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Specifications subject to change without notice or obligation. *Cellular blocked in USA. Unblocked versions available to qualified users, documentation required. **Optional stereo headphones required.

ScopeStation An All-in-One RX-320 Program

TenTec's small black RX-320 receiver has been one of my favorite computer-controlled radios for many years. Where the Icom PCR-1000 has the edge for wide range, the RX-320 does a great job in its shortwave-only frequency range. Although amateur radio operators have known the TenTec name for many years, the RX-320 made it known to shortwave listeners (SWLers). Now, a new RX320 program by CallSign Software has appeal to both hams and SWLers.

What's in a Name?

CallSign's new software is called ScopeStation. I'm not sure that the name does justice to all the software's features. ScopeStation seems to be an amalgamation of a number of previously released software efforts by the company. ScopeStation has the capability of controlling the RX-320 and RX-350 receivers and a lot more. Its avowed purpose is "...advanced listening and signal analysis... built for advanced ham radio operators and shortwave listeners..."

Interested? You *should* be if you own or are planning to buy one of these excellent computer-controlled TenTec receivers. We tested ScopeStation SC320, version 3.00.15, which can be used with the RX-320 and DRM ready RX-320D, available from TenTec at <http://www.tentec.com>. Also, keep a keen eye on the used market and ham shows for deals, especially on the RX-320. Make sure your receiver is using the latest firmware. Older firmware versions may cause connect problems.

ScopeStation's minimum computer requirements are modest: Pentium I 300MHz PC with 128M of RAM memory and an 800x600 display resolution. A free serial port and soundcard are also needed to take full advantage of ScopeStation. Using a USB to serial port adapter is possible "... as long as the adapter is capable of sustained data transfers..."

The size of the required hard drive space is primarily a function of the database(s) you wish to store. The program and features take about 6 Meg of hard drive. Database storage is another matter. A 12,000 record database file requires 85 Megabytes of hard drive space, but that's a huge database. The comprehensive ILG Summer 05 database weighed in at just under 7.6M when converted into CallSign format.

ScopeStation will only run on Windows NT4.0, 2000PRO, XP, ME, Windows 98 and Windows 98SE. We used a Pentium II 400 MHz, 128M RAM laptop via the serial port, under Windows 98SE and it ran perfectly.

Installation

In the normal manner, the RX-320's serial port was connected to the PC's COM Port 1. Then the receiver's "Line-Out" was connected to the "Line-In" of the PC's soundcard.

The ScopeStation installation software package is fairly compact at just under 1MEG. Since the file is in a "zip" format, WinZip was used to unzip and install ScopeStation. The process was quick, easy and without a problem.

The first time you run the program you must indicate which COM port is controlling the receiver. In less than two minutes, ScopeStation's main screen, Figure 1, was being displayed on my PC.

Operation

Although ScopeStation has a lot of features, it really uses only two main screens. Figure 1, the Radio (or Ham Radio) screen, has just about any radio command function you could possibly desire. We'll just cover some of the basics to give you a "feel" for the program's operational philosophy and capabilities.

You can see from the large numbers in the top center of the display we are tuned to 9841.00 kHz. Tuning can be accomplished using many different tuning methods. Left clicking on these big numbers allows us to enter a frequency from the PC keyboard. To the right of the big number is a calculator-like "keyboard" where we can enter frequencies by clicking the calculator keys and then the "ENT" key.

A tuning "knob," seen with a hand pointing right, is provided at the bottom center of the display. When the cursor is moved to the right of

the knob and the left mouse button clicked the receiver tunes to a high frequency. When the cursor is hovered over the left side of the knob, and the left mouse button clicked, a lower frequency is tuned.

If we look below the large number, a horizontal "tape-tuning" display can be seen running from 9.5 on the left to 10.0 on the right. This area provides click, or click and drag tuning.

If we look closely at this bar or tape, we can see that it also shows the use of the frequency segment. Here, we are in the 31 meter broadcast band as evidenced by the 31m seen between the 9.7 and 9.8. ScopeStation annotates allocated aircraft, broadcast, maritime and ham frequencies in this manner. I found this a very useful feature.

The two variable frequency oscillators (VFO), A and B, each store a frequency and mode parameter. They are very handy for moving back and forth between frequencies (QSYing). Also notice that the beat frequency oscillator (BFO, offset of the CW mode tone), receiver incremental tuning (RIT), and passband tuning (PBT, located above the tuning knob) can each be set or tuned independently.

We'll explore even more main tuning methods later on another screen.

Extended Features

ScopeStation provides operational features not found in the original TenTec software. One example of an extended feature is the addition of SAM+ (Synchronous AM Upper Sideband) and SAM- (Synchronous AM Lower Sideband) modes to the RX-320.

The area just below the tuning "tape" is

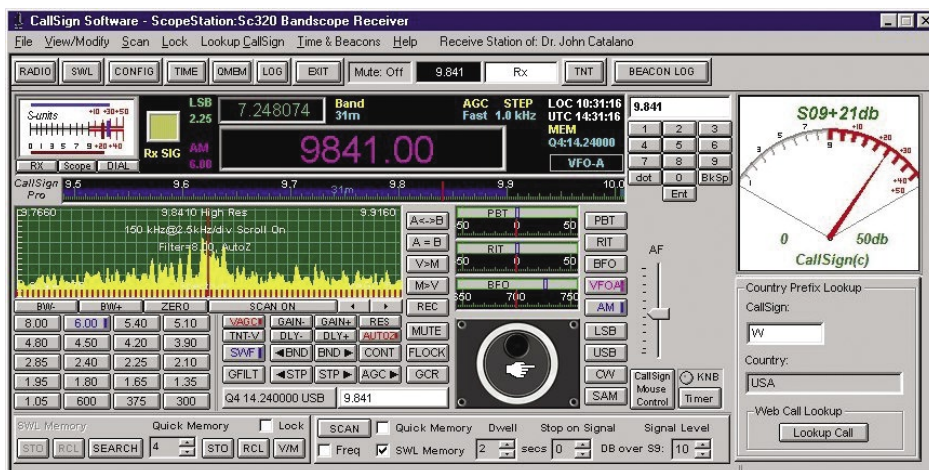
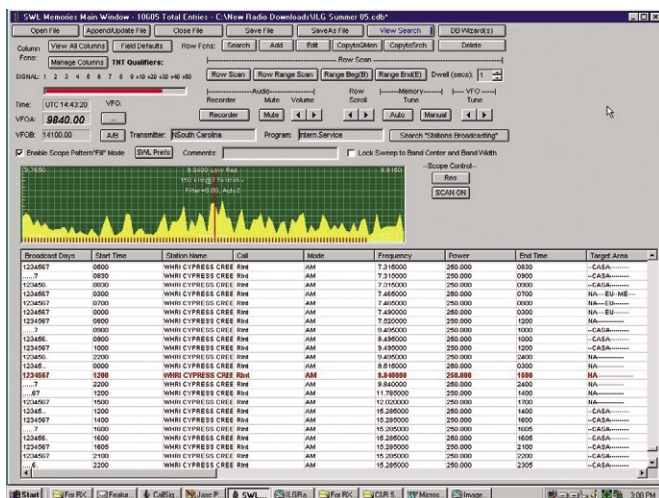


Figure 1 – ScopeStation's Ham Radio Screen



where the program got its name, ScopeStation. This graphical area can display a great number of different graphical modes, from minute signal details to spectrum signal mapping. In Figure 1 we have mapped and displayed the frequency spectrum range of 9.7660 MHz (at left) to 9.9160 MHz (seen at right). It should be noted that, when creating this graph, the RX-320's audio goes quiet until the scanning is completed.

The signal that we are monitoring on 9841.00 kHz is shown in the middle of the display. The user has control over virtually all the display parameters, including bandwidth, gain, zero level and more. Control of these graphing parameters is via keys below and to the right of the graph area.

According to the Help File, some of ScopeStation's digital scope capabilities include:

- I.F. Filter Scope Display that plots and tracks a swept signal through the selected filter pass-band with frequency edge readouts.
- I.F. Display Scope with graphical PBT, filter selection, and center zero.
- Extended Scope Display with digital noise filter and digital signal amplifier and two (2) display formats with a sweep data memory for each band.
- Spectrum Scope Display includes sweep controls for scan bandwidth and filter
- Scope Control includes plot type, auto zero, signal jitter, scale resolution, signal gain, and vertical AGC.

The scope modes and settings are accessed via the “CONFIG” Button visible at the top of Figure 1. This button and the resulting menus are used to set many other ScopeStation parameters.

 Much More

Scanning and memory manipulation operations are accessed and controlled at the bottom of Figure 1. ScopeStation provides two memory modes, a host of scan parameters, a ham beacon log and a list of time stations in North America.

Two signal meters are prominent on the left and right sides of Figure 1. Under the right meter is an area that the user can use to identify call signs and call sign prefixes. For example, assume we have heard a station whose call sign starts with a “W”. We have typed a “W” in the top box and the box below identifies it as a station licensed in the USA.

If we enter a full ham call and then select the “Lookup Call” button, the program will go to the **QRZ.com** website to identify the name and location of the ham operator. This full call sign feature is very nice but is limited to ham stations. Broadcast and utility call signs are not currently accommodated. (ScopeStation authors take note!)

**Dedicated
SWL**

Look at the “buttons” along the top of Figure 1, starting with “RADIO”.

You will notice the next button is labeled “SWL”. Clicking this button brings up Figure 2, an entire screen dedicated to SWLs’ way of monitoring. The SWL screen, Figure 2, is divided into three main areas.

Top Region

Here database manipulation takes place. ScopeStation's DB Wizard (top right) has the ability to import and convert just about any frequency database. However, importing and converting the free on-line ILG database available at <http://www.ilgradio.com/ilgradio.htm> is a no-brainer done with two mouse clicks. Just be sure to download the text version of the ILG database. Once you have created a database, you can add, delete, edit and import entries. More on the database below.

The next few lines in the top region provide receiver control and a digital audio recorder function. The VFOA box on the left side of Figure 2 shows that we are tuned to the same frequency 9840. I did some fine tuning which accounts for the 1 kHz difference between Figure 1 and Figure 2's frequencies. A bar graph above the frequency shows signal strength.

Since the last lines in the top section are connected to the database, we'll jump to the bottom section of Figure 2, where the database entries are displayed.

Versatile Database

The bottom region of Figure 2 displays the ILG Summer 05 database converted into Call-Sign Software format. This database, with each entry capable of displaying twenty-nine fields of information, is an SWLer's dream. Best of all, it's easy to use.

In Figure 2, we are attempting to identify the broadcast on 9.840 MHz that we are monitoring. The call sign WHRI was heard. Therefore, we have sorted the database by Station Name. Simply clicking on the top of the column labeled “Station Name” performs this sort. Then we scrolled down to find that WHRI, from Cypress Creek in the Carolinas, is scheduled to broadcast on this frequency, on this day, at this time and targeting North America.

All the database functions work great. We can add our own intercepts to the database just

by clicking “ADD” in the Top Section and then completing the “Station Information Sheet.”

To edit any entry's data field, all it takes is a right click on the field, opening a box that allows you to edit the contents of that field. Very simple and very convenient.

Database Tuning

As if we didn't have enough ways to tune the RX-320, here is yet another method. Double clicking on a database row tunes the RX-320 to that entry's frequency, mode and filter parameters.

Another Scope

Finally, the middle region of Figure 2 displays an expanded graph as seen in Figure 1. Graphing parameters are limited to graph resolution and start display scanning.

❖ Scoping It Out

ScopeStation adds lots of great features to an already great shortwave radio, TenTec's RX-320. Space did not permit us to cover all of ScopeStation's capabilities. The authors of ScopeStation have designed the program to accommodate the needs of both the Ham and SWL communities, without requiring either to sacrifice key features.

The only suggestion I have is that the Help file be redesigned to include more details and examples.

ScopeStation SC320 is well thought-out and executed and will be an asset to any ham or SWLer using the TenTec RX-320 or 320D. ScopeStation SC320 can be downloaded from <http://www.callsignsoftware.com> for \$59.95 (CallSign Software, P.O. Box 652, Merrimack, N.H. 03054-0652; email info@callsignsoftware.com). ScopeStation is also available for the TenTec RX-350 for \$69.95. CD versions are available for an additional \$6.99.

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What's NEW

Tell them you saw it in Monitoring Times

Sony 2010 Commemorative CD

It's been 21 years since Sony created the amazing ICF2010/2001D radio – “the best selling and most popular short wave radio ever made,” according to aficionado Steve Whitt (and thousands of 2010 owners). Some years back, Whitt published the booklet “Get the Best from your Sony ICF2010/2001D” and then “Get Even more from...” In the intervening years he has continued to accumulate material relating to this classic radio, which is now out of production.

Richard says, “Recently I archived my own files onto CD as a personal archive and I realized that I had material that was no longer available in print and which had vanished off the Internet!” So he has decided to reproduce the CD at cost for anyone who wants it for their personal use and enjoyment.

The CD contains the two booklets, advertisements, articles on how to modify or improve the Sony 2010, a photo gallery of different versions of the radio from around the world, repair tips, service manuals, user guides, and much, much more. The more than 500MB of information are in .doc, .pdf, .bmp, .jpg, .txt and .xls formats. English is the working language.

There are two ways to order a copy:

1) By Post - Write to Steve Whitt (Landsvale, High Catton, York YO41 1EH, England) enclosing payment and your mailing address and he will send the CD by return post. Cash payments can be \$11US; 10 Euro or £5 Sterling notes well concealed inside an ordinary letter envelope. You can decrease the risk of sending cash by using registered mail. Non-cash payments such as checks, Postal Orders or International Money Orders must be £5.00 Sterling.

2) Over the Internet - You can use PayPal by sending payment to: icf2010@uk2.net The PayPal prices are \$11.75US; 10.75 Euro or £5.50 Sterling due to the charges levied by

PayPal.

Says Steve, “This unique CD contains a valuable archive of material, some of it rare, all of it interesting.”

The Ham Band

Yes, you read it right. There is a musical Ham Band made up of Andrew (G3WZZ/OZ1XJ/OZ5E), his wife Lissa and a group of Nashville session musicians. The “Seek You” (pun intended) CD of songs about amateur radio is accompanied by a booklet which tells the whole story of contests, DXpeditions, antennas etc.

You can check out song samples on their website (<http://www.hamband.com>), including *On the Monday Evening Greyline*, *Always on the Air*, *The Contest*, *The Radio Widow*, *Rotuma Bound*, and *It's Great to QSO in Morse Again!*

To order the CD in the US and Canada call 1-800-721-4077 or 208-882-6526; otherwise send email to lissa@lissa.dk and she'll tell you what to do. You can also follow a link to buy the CD electronically (MP3).

Now for the best treat of all – Point your browser to <http://www.hamband.com/html/video.html> to watch a one-of-a-kind ham radio music video, featuring Andrew singing at the top of the 100 foot tower and Lissa up at 66 feet singing the harmony vocal! Bob Grove says, “That is one of the most inspirational and remarkable things I've ever seen promoting ham radio!”

Of course, they could also be nuts – you be the judge. But we can guarantee this is one website link you'll be passing on to all your online friends!

Alinco DR-635T Transceiver

A new dual-band mobile/base transceiver was released this summer by Alinco, noted for high-quality,



affordable amateur radio gear. The DR-635T offers “newly designed RF circuitry for increased resistance to interference from adjacent signals,” according to Russell Dudley, KW5O, president of Alinco's North American distributor.

The DR635T receive capability is 108.000-173.995MHz, 335.000-479.995MHz, and 87.5-107.995MHz, including AM aircraft band reception, and it transmits from 144.000-147.995MHz and 430.000-449.995MHz, including the ability to operate on MARS frequencies.

The dual band radio features cross-band repeat, full duplex capability, and a detachable remote mountable control head. You can choose to illuminate the large, six-character alphanumeric color display in blue, violet or orange. It features 200 memory channels, ignition key on/off feature, theft alarm feature, CTCSS, DCS encode/decode and DTMF encode functions along with European Tone Bursts. A variety of scan modes is available. It also includes a new protection circuit which will automatically change the power setting to MID if the internal temperature rises while operating in the high-power setting.

Included with the DR635T is the EMS-57 feature-packed microphone. Digital operators can also order the optional EJ-50U packet board or EJ-47U digital voice board that fits inside the transceiver.

Street price for the DR-635T is around \$350.

Voice Scrambler

Here's a unique product – not for radio waves, but for sound waves. Just as digital signal processing (DSP) can make headphones, speakers, and receivers that analyze and filter out noise to make speech more intelligible, sound can also be processed to make speech *less* intelligible!



“Babble” is a device composed of a sound processor and several

speakers that multiply and scramble any voice that comes within its range. About the size of a clock radio, the first model is designed for a person using a phone, to render his conversation meaningless to bystanders. Other models will work in open office space – at last, privacy even in an office cubicle!

The voice scrambling technology used in Babble was developed by Applied Minds, and is offered by Sonare Technologies, a Herman Miller company (<http://www.sonaretechnologies.com>; 877-858-8898) for \$395. Listen to a sample audio file on their website and reminisce about the old days of speech inversion!

Window/Balcony Antenna

MFJ Enterprises has introduced two antennas with built-in tuners which are perfect for apartment dwellers. The complete antenna system mounts on window frames, balconies, or railings and is suited for transmitting as well as signal reception.

The MFJ-1625 (\$199.95) covers 80-6 Meters. It includes universal mount/clamp, built-in antenna tuner with RF isolator, long 12 foot telescoping whip (22.5 inches collapsed), high efficiency loading coil for 40/80 Meters, counterpoise wires, and safety rope. It will handle 200 Watts on transmit.

The MFJ-1623 (\$179.95) is like MFJ-1625, but covers 6 through 30 Meters. Both are protected by MFJ's one year limited warranty.

To order, get a free catalog, or for your nearest dealer, call 1-800-647-1800; write to MFJ (300 Industrial Park Road, Starkville, MS 39759); or go online to <http://www.mfjenterprises.com>



Books and Equipment for announcement or review should be sent to What's New, c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC, 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel.Baughn,editor@monitoringtimes.com.

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